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AIR TRAILS

Pictorial

contents

APRIL, 1948
VOLUME XXX, NO. 1

This month's cover features the painting of the Northrop YB-49 done by Frank Tinsley, aviation's foremost artist, whose work frequently appears in the pages of Air Trails Pictorial. Always far ahead in his ideas, Tinsley's paintings and drawings featured, years ago, aircraft that are just now coming into use. In the YB-49 Frank sees his ideal of aircraft. Jack Northrop realized this ideal.

Comments and suggestions concerning articles and plans appearing in this publication are always welcome. Readers are cordially invited to express their views on the type of material they prefer.

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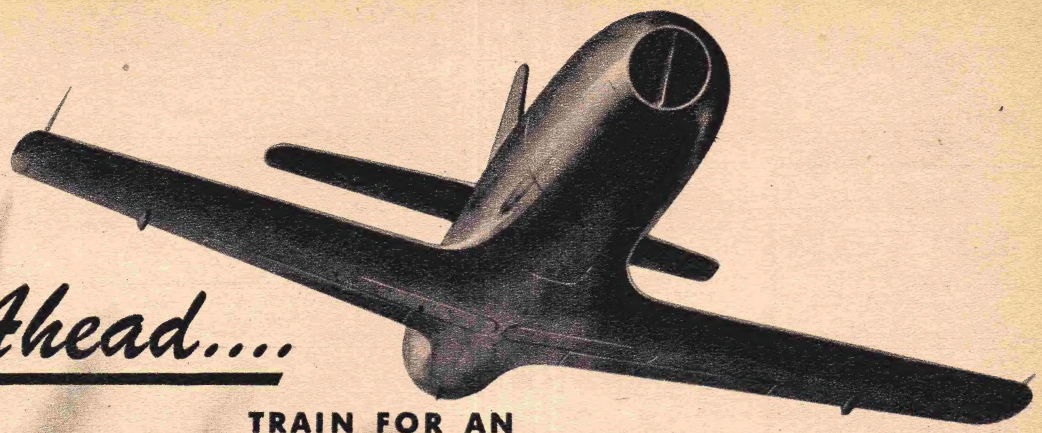

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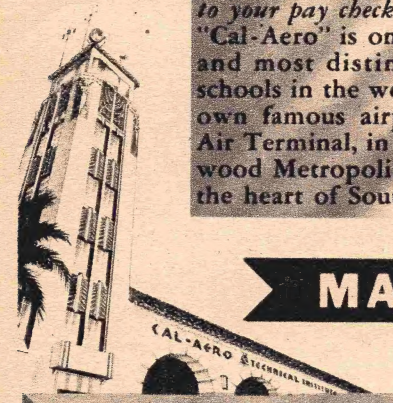

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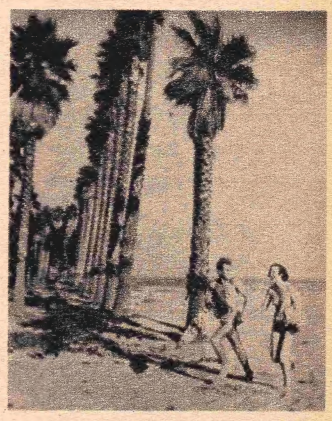

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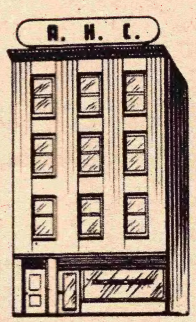

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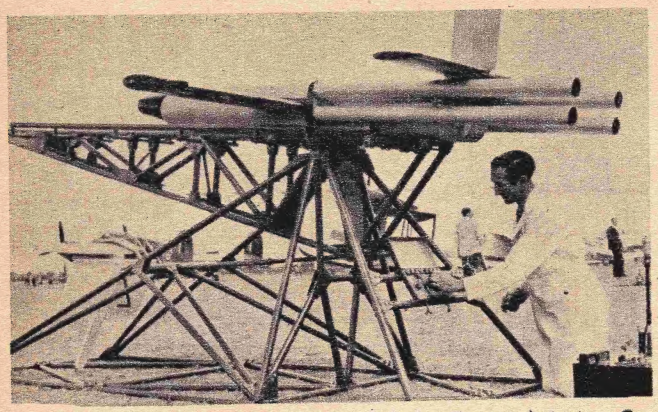
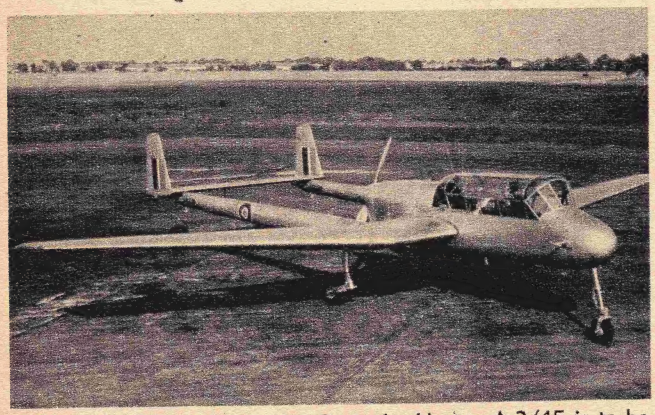


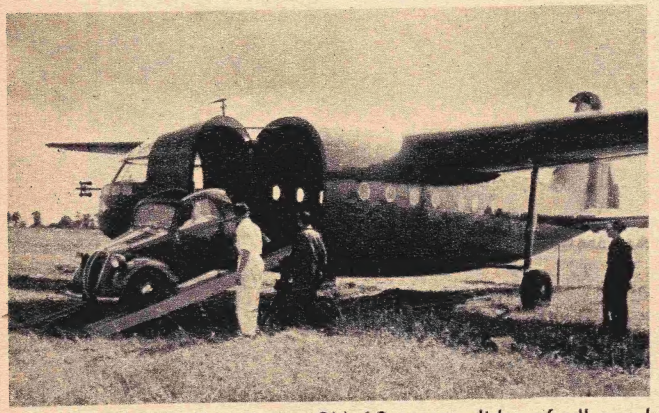
● British radio-controlled missile built by Fairey Aviation Co. Weight 720 lbs. Speed 500 mph. Rockets give 6000 lbs. thrust.

● Sikorsky S-52, two-place helicopter featuring all metal rotor blades, has been licensed by the CAA for day and night flying.



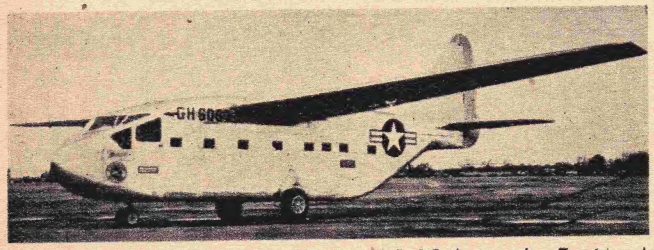
● Britain's Flying Observation Post, the Heston A.2/45 is to be used for artillery spotting. It is powered by a 240 hp Gypsy.

DEVELOPMENT HIGHLIGHTS

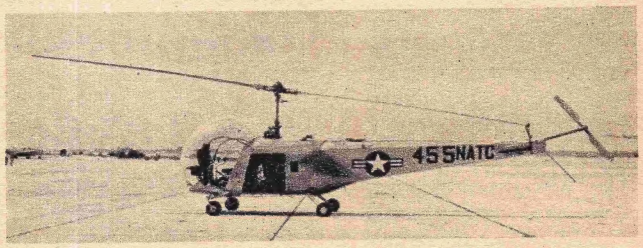


● French Castel-Maubussinn CM 10 cargo glider of all-wood construction. Gross weight is 7 tons, useful load is 8800 lbs.

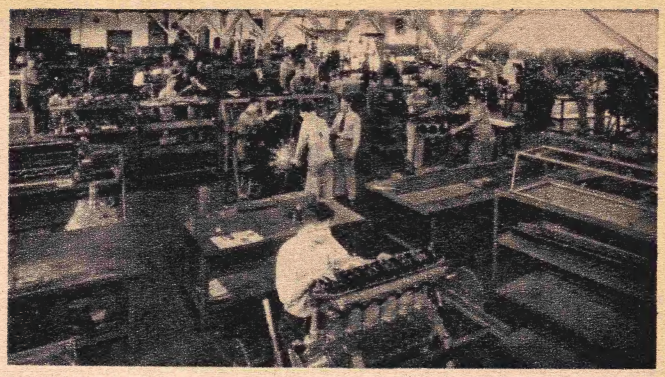
● Percival Premtice three-place trainer, carries two students to accelerate instructions. Powered by a 250 hp Gypsy engine.



● Latest military glider, the Chase XCG-18 Aviatruk. Equipped with rear cargo ramp, has load carrying capacity of 8000 lbs.



● Equipped with dual controls for training, the Air Force's Bell YR-13 helicopter joins the Navy under the designation HTL-1.



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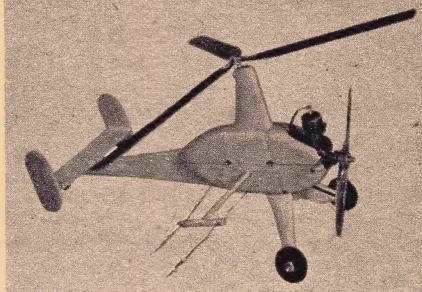
Shocase

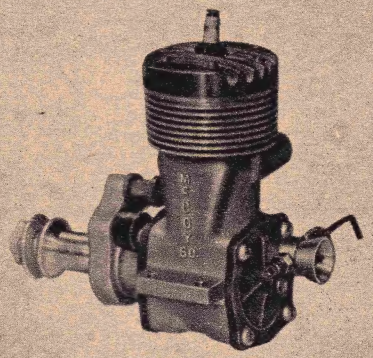
THEY LAUGHED WHEN GEORGE SHOWED UP

But their laughter turned to cheers when George W. Moore, 100 Beaver St., Waltham, Mass., flew his power driven control-line auto-giro. Now it's available in kit form for $6.75. Features direct rotor control, 3 full feathering articulated, laminated rotor blades, ball bearing hub.



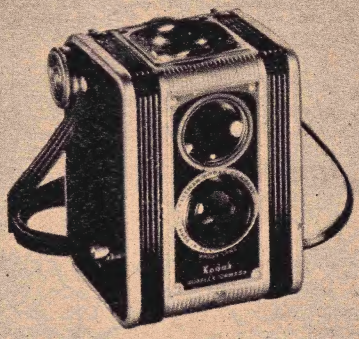
DURO-MATIC UNVEILS NEW McCOY 60 ENGINE

Fourth in family of McCoy Red Heads is new McCoy 60 (Series 20) engine which delivers over 1 hp at 15,000 rpm. Features 2 ball bearings, 2 piston rings, has redesigned backplate and enlargement of bypass for greater peak performance. Identified by its red head. $27.50.



SWEET AND LOW (IN PRICE) IS A DUAFLEX

Eastman Kodak Co. comes up with least expensive reflex camera yet, the Duaflex, selling for $11.75 plus tax. Takes twelve 2¼" sq. shots on #620 film. Features built-in flash synchronization. Fixed Kodet lens, large reflecting finder. Flash holder comes at $2.50 plus tax.



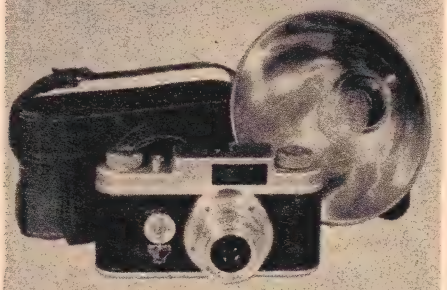
SPRINGSKID LOGICAL GADGET FOR GASOLEER

Rite-Flite Specialties out Inglewood, Calif., way comes up with a nifty for gas model flyers: the Springskid tail skid. Costs 25¢, available in two sizes—3⅝" and 2⁷⁄₁₆". Developed by Joe Weathers. Has loop at aft end for use with 1-man holding device.

OHLSSON & RICE "PLUG" NEW FUEL

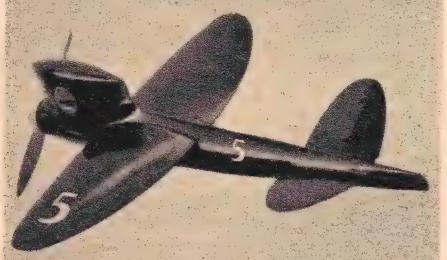
After a lengthy period of testing, Ohlsson & Rice, Inc., introduce two new fuels, "O & R #1" for any standard ignition engine, and "O & R #2" for glow plug equipped power plants. Pints 75¢; quarts, $1.40. Outfit also has its own new glow plug retailing for 85¢.

MODEL-HOBBY ITEMS—SOME OLD, SOME NEW—TO PLEASE THE DISCERNING HOBBYIST. ALL ITEMS AVAILABLE AT MOST DEALERS, UNLESS OTHERWISE NOTED. WHEN ORDERING TELL 'EM YOU SAW IT IN "THE SHOWCASE." SPECIFICATIONS AND PRICES ARE CHECKED CAREFULLY, BUT ARE SUBJECT TO CHANGE



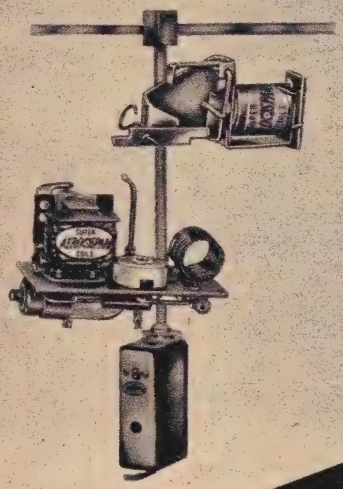
ARGUS BRINGS DOWN H.C.P. WITH MODEL 21

Argus takes a healthy swing at high cost of photography with new Model "21" 35 mm camera equipped with the Markfinder enabling you to see eye-to-eye with the f/3.5 Argus Cintar lens. Built in flash synchronization. With case and tax, $58.08. Flash unit, $8.75.



NO DRAGGIN' WITH THIS SPEEDWAGON

Harold deBolt's Model Engineering Co. introduces the Dmeco "Speedwagon" with built-in "Circle Flight" and "weather vane" stability. For Class C and D engines under new AMA rules. Last December it did 132.8 mph with McCoy "49." Beaucoup zip. $4.95.

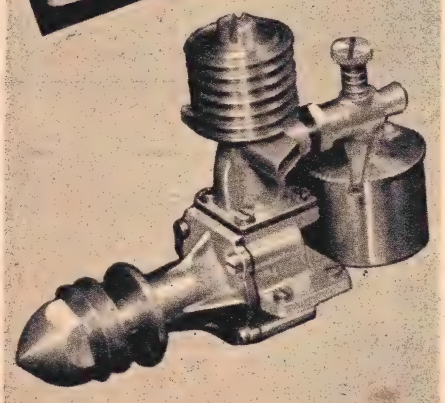


MINI-SIZE R-C UNIT EVEN FITS CLASS A

Smallest, lightest radio control unit made weighs 1.9 ounces and comes from Aero Spark, Kingston, N. Y. Used in models of 36" span. Effective range, 2½ miles. Complete unit is factory-tuned, ready to install, consists of rcvr, xmtr, escapement and fabricated antenna plus manual.

ROBERTS SAYS RIGHT PITCH IS "RITE-PITCH"

Bob Roberts, 110 W. 7th Ave., Gary, Ind., has stepped up production and sales campaign planned to convince every modeler that Rite-Pitch is the prop to watch. Outfit has "Engine-Prop Recommendation Chart" and "Compendium of Info on Gas Model Props" available.



ENGLISH DIESELS NOW AVAILABLE OVER HERE

If you've been badgering the editors on how to get an English diesel engine your search is ended. Electronic Developments Ltd. has E.D. 2 cc. Mark II diesel and its special contest counterpart. Write USONA Trading Co., 39 Broadway, New York City 6, for details.

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California Eastern Airways, Inc.

GENERAL OFFICES
OAKLAND MUNICIPAL AIRPORT
OAKLAND 14, CALIFORNIA

December 26, 1947

SALES OFFICES
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Mr. O. D. McKenzie, President and General Manager
Aero Industries Technical Institute
Oakland Municipal Airport
Oakland 14, California

Dear Mr. McKenzie:

I have had the pleasure on several occasions to visit with you and inspect the modern training equipment and shops used in your outstanding engineering and mechanics school, and I have no hesitancy in recommending your training to any young man or woman who is seriously interested in following aviation as a career.

California Eastern Airways are operating two-way daily cargo schedules Coast to Coast, using Douglas DC-4 airplanes. To maintain our schedules and render the outstanding service for which Cal-Eastern has been able to establish such a national reputation in the cargo transportation field, requires an unexcelled engineering and mechanical staff to keep our engines and airplanes in top flying condition.

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You may be assured that we consider Aero Tech graduates high caliber and competent young men in every respect, and we will have no hesitancy in employing them as needed.

Very truly yours,

CALIFORNIA EASTERN AIRWAYS, INC.

Allan A. Barrie

Allan A. Barrie
Vice President - Operations

AAB:ls

The accompanying letter proves once more that AERO TECH training is designed to produce "employable" and "promotable" career men for aviation.

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OAKLAND MUNICIPAL AIRPORT

OAKLAND 14, CALIFORNIA

EST. 1937 • **O. D. McKENZIE, Pres.**

COL. ALLAN A. BARRIE

Allan A. Barrie is a veteran of more than 18 years of executive pilot assignments. An air line pilot with more than 13,000 flying hours, Barrie was Vice President—Operations of Western Air Lines prior to the war. During World War II, he served as a Colonel in the Army Air Forces, Assistant Chief of Staff—Operations of the Ferrying Division of the Air Transport Command and directing the actions of 25,000 men who were transporting personnel and materiel in scheduled service totaling more than 34,000 hours' flying time per month. In the United States he was awarded the Legion of Merit for outstanding war service.

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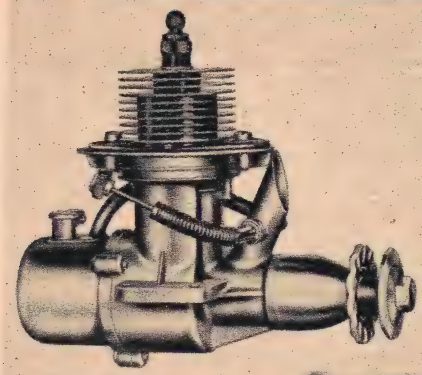
Showcase



HOT-HEAD STRICTLY OK ACCORDING TO HERKIMER

Herkimer Tool and Model Works, Inc., has brand new "O.K." Hot-Head engine designed for Glow Plug use. Sells for $12.50, less plug. Has extra heavy crankcase and long bearing. Class B, disp., .299; bore, .760; stroke, .660. Rpm's up to 11,000; weight with fuel, 7 oz.

"IKE FOR PRESIDENT" SAYS ENTERPRISE

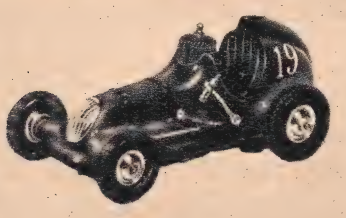
And why not? What wonderful publicity for Enterprise Model Aircraft and Supply Co. and its Howard "Ike" control-line racer. Kit is $2.95 complete except for "I'm for Ike" button. Span of 24" is fine for Class A or B engines. Boomed as a stunt ship; balsa wings are shaped.

HEY, LAZYBONES! THIS IS FOR YOU

"Leave it to Sal-Mar Woodworking Specialties, P.O. Box 65, Station Y, Brooklyn, N. Y.," says Sal-Mar. And what'll they do? Cut out upon order all printed sheets and wood parts of any kit. "A service to help modelers do faster and better job," say they.

INGELLS TELLS ALL ABOUT THE SKY TAMERS

"They Tamed the Sky" is Douglas J. Ingells' new book about the perfection of high altitude flying, jet propulsion, aerial photography and many other developments of modern aviation. Details in lively style work of Wright Field. From Appleton-Century-Crofts. $3.50.



MODEL CAR RACING EASY WITH AKRON UNIT

If you've admired those slick little Thimbledrome scale racing cars, East Akron Model Shop has the conversion kit for you to accommodate a Bantam engine in the car. Includes bevel 1-to-1 ratio gears, flywheel, threaded axle, motor mount, ball bearings. Complete, $10.95.

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STUDY IN MIAMI - - AIR CAPITAL OF THE WORLD

AIR NOTES AVIATION TODAY AND TOMORROW

By John Forney Rudy

STALL WARNER FOR PRIVATE PLANES: Pressure is on for equipping all private planes with stall warning devices, now that tests show that not only students, but pilots and instructors, consistently fail to detect pre-stall conditions in light aircraft--one of the most frequent causes of serious lightplane accidents.

Studies show that a typical pilot cannot identify the 'edge' of a stall when he consciously tries to bring his plane to that point. Planes especially equipped with a device similar to a pinball machine proved pilot's failure to detect approaching stalls.

CHANNEL WING JOB: What may be the most important aviation development in a decade will be the commercial marketing by the end of the year of a family size lightplane featuring a channel-wing principle, enabling the plane to easily clear a 50-ft. obstacle within 50-ft. takeoff, the ability to land and takeoff disregarding wind direction, and landing at 15 mph in dead air. Price of the plane is expected to be less than that of present four-place conventional lightplanes.

The unconventional, although highly successful in all tests, Custer channel wing plane was developed after years of experimentation by W. R. Custer of Hagerstown, Md. Both wings are U-shaped and propellers are located aft the U-shaped wings, pulling the air over the wings so that lift is created as soon as propellers rotate.

Important Army and civilian aviation aerodynamicists have already hailed Custer's plane as superior to any known propeller wing combination. Moreover, the channel-type wing is ideally adapted to jet or rocket propulsion, as well as to glider operation, since the channel wing glides about 30% better than standard wings.

Actually tests now show that the Custer channel wing performs similar to the helicopter in static lift and at very low speeds, without the disadvantages of the 'copter. Takeoff and landing can be accomplished almost vertically in an emergency; yet it can fly as fast as the average lightplane. It thus incorporates by its inherent construction a safety feature unavailable in comparison with any other lightplane.

PRIVATE INVENTORS BUSY: Scores of serious problems affecting military aviation, and in many respects commercial aviation, are today under consideration by the National Inventors Council in Washington which acts as a clearing house and guidance agency for inventors. Here are a few typical problems in aviation for national defense:

How to solidify soils to support the emergency operations of military aircraft of great weight? Investigations to accomplish this objective by chemical means, by using electrical energy, freezing soils for long periods and by mechanical means of compaction or pressure are all underway.

New types of fuels and lubricants for use in extremely hot or cold climates, particularly in the latter, are needed. Temperatures of -65F cause gasoline to jell and oil to get so solid it freezes bearings.

A gliderborne lifeboat which can be launched from water or land and towed by powered aircraft to persons in distress in the water is needed. Upon reaching the scene the gliderboat would be released from the towplane and glided to the surface of the water. Wings and tail could be jettisoned and a small engine and propeller would maneuver the boat.

Plastic landing mats to replace mats made of critical or expensive metals are needed. The ease of fabrication, strength, weight and flexible nature of plastics could help solve many of the problems now confronting aviation engineers.

INDUSTRY INVENTORS BUSY, TOO: Aviation is one American industry in which new developments never cease. Among these newest developments are: a new type of gaseous 'cold light' for taxiway markers for large airports, with low electric consumption and maintenance costs. CAA is carrying out the experimentation work.

A new anti-ice skid tire has been developed by Firestone and by Goodrich for use on icy runways. Both tires feature embedded steel wire coils in the tread to provide biting traction.

Something new has been added to the executive DC-3 of the CAB in Washington, which may later turn up on commercial airliners, functional control handles. Now being thoroughly tested is a new landing gear lever with a small wheel embedded in the handle conforming to the plane's landing gear wheels and providing instant touch identification to the pilot. Also under observation is a flap handle flattened out to match as nearly as possible the wing flap it operates.

NEW PACKET: Watch the new Fairchild Packet as the leading contender for 'flying boxcar' used by the Air Forces. Thirty-seven C-119's are now building. The new Packet is nearly 20 mph faster, able to carry about 75% additional load over the same range compared to the old C-82A. Moreover, a special type tractor tread is being developed so the new Packet can use rough, soggy or sandy fields and may point the way for a real airborne Army of the future.

Enrollments Still Being Accepted for April 5th Classes!

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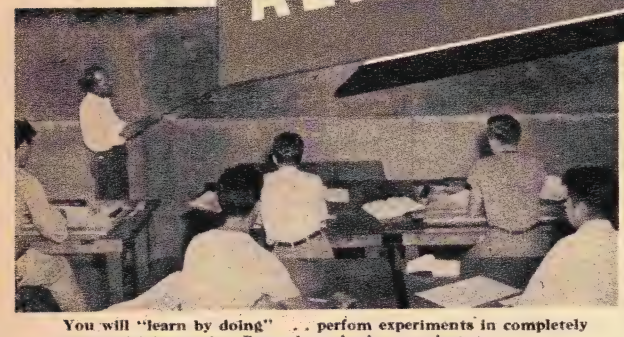
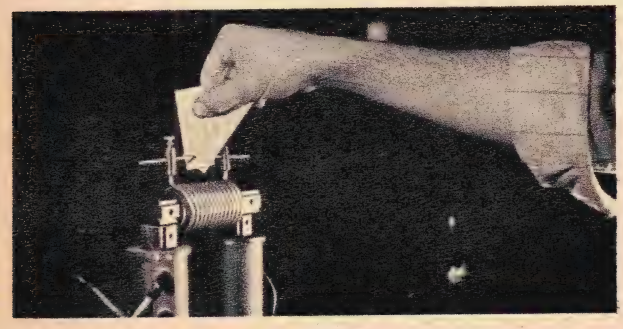


You will "learn by doing" . . perfom experiments in completely equipped laboratories. Below is a physics experiment.



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AIR NOTES AVIATION TODAY AND TOMORROW

FRENCH DEVELOPMENTS: Aircraft manufacturers in France by the end of this, or early next year, will plunge vigorously into the world markets for aircraft sales; are developing a 30-passenger 340 mph transport, a four-engine cargo job designed to carry 18 tons of freight, and a 140-ton seaplane with eight engines of 3500 hp each all for the export market.

NEW SCHOOL TO SOUTH: Brazil will open its newly created Aeronautical Technical Center at Sao Paulo this month. The Center's School of Air Commerce will be headed by a long-time former CAA official, Charles I. Stanton.

In many respects the Center will be a combined CAA Indianapolis Experimental Station, the Air Force setup at Wright Field and a National Advisory Committee for Aeronautics.

FUEL RESEARCH: Jet engine and guided missile fuels are being subjected to the biggest and most comprehensive development program yet gotten underway. Oil companies are determined to perfect fuels to the point where further research must be done on engines, metals, fuel systems and other components of jets and missiles rather than any shortcomings being found in the fuels.

Research is being concentrated on new types of fuels and lubricants specifically adapted for extremely hot or cold climates. As military strategy continues to put the accent on Arctic operations so will research be concentrated on that type of climate.

As one example, The Texas Co. has just completed a new laboratory at Beacon, N. Y. employing 800 persons. Here research and testing will be concentrated on petroleum fuels adaptable to or susceptible to use in ramjets, turboprops and turbojet combustors under actual flight conditions.

AIR SCIENCE LEAPS AHEAD: Scientific instruments in warheads of rockets and guided missiles has brought more knowledge about the earth's upper atmosphere in the past 12 months than had been acquired in the previous 20 years. This knowledge will be used for high flying planes, as well as missiles that may fly continuously around the earth or even between the planets.

JAMMING BY DROPLETS: Biggest problem of airways surveillance radar, used for scanning of peacetime commercial air traffic on an experimental basis, is the fact that clouds containing water droplets of certain sizes are returned to the radar in echoes which obscure vital aircraft information. Perfected airways surveillance will help considerably in speeding up approaches and cutting down stacking delays and result in better air traffic control.

AIR MISSIONS: More U. S. technical aviation missions to Latin America are coming up, particularly to Uruguay, Chile, and Venezuela. Such missions, to spend 6-12 months on specialized civil aviation problems, will probably leave the U. S. shortly for Colombia, Ecuador, and Bolivia to help standardize equipment and procedures, and which by their work should help to promote American aviation.

AVIATION EDUCATION: Not an industry in the U. S. can begin to approach aviation in the educational campaign it has and continues to carry on. For this CAA does a better Government job than any of the hundreds of departments and agencies.

Last year more than 13,000 instructors from grade school to college took part in aviation education; 47 States have been assisted in such activities and 30 of them have published descriptions of their school-to-college aviation education programs.

Last Summer alone, more than 70 teacher training workshops in aviation were conducted. More than 7,000 key school people took part in some 73 airport operations institutes.

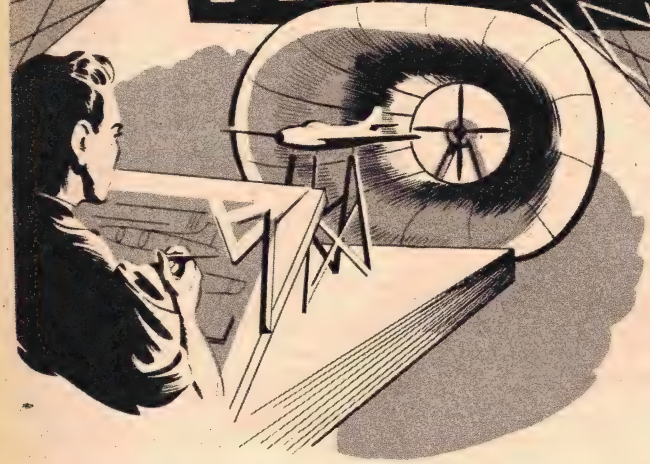
EXPANDED AIR FORCE: Pressure, as only Washington knows it, is on now for a U. S. Air Force composed of 70 Groups consisting of 6,850 active aircraft backed by a reserve of 5,570 and an additional 2,500 storage planes. Under this program the average military plane would be in first line service slightly less than five years.

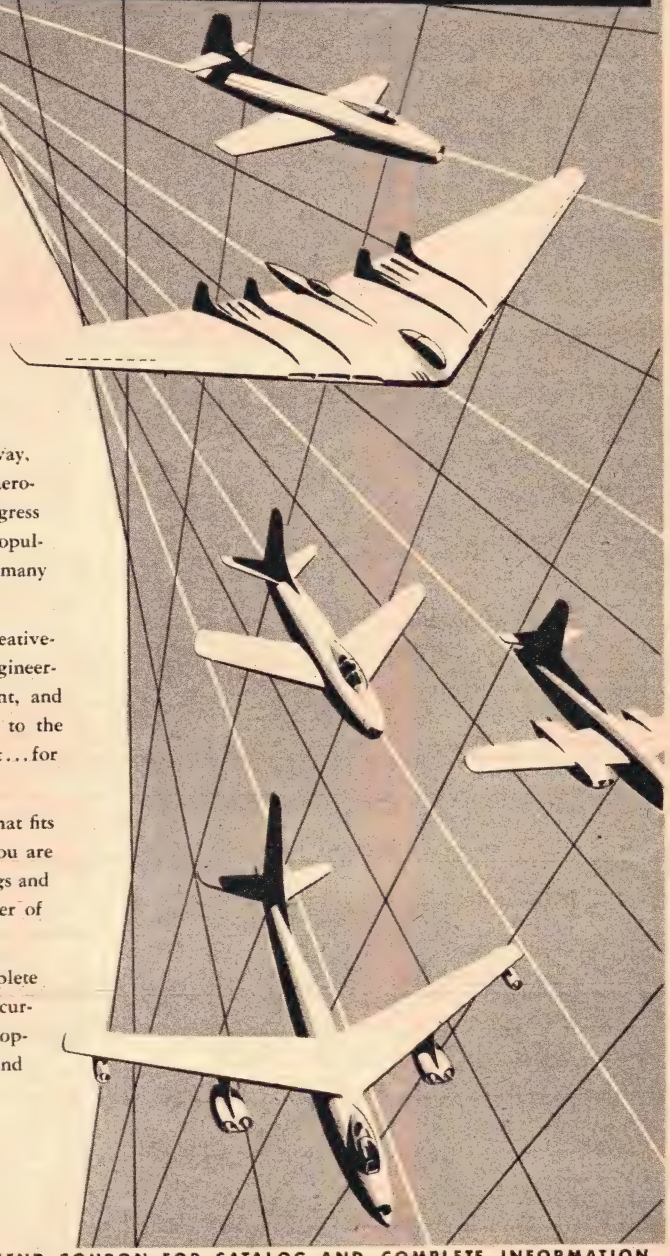
NEITHER STORM NOR NIGHT: . . . Don't rule out the personal plane as the ideal type of aircraft for short airmail hauls. Experimental air routes in the East may begin shortly with four-place personal planes if a Washington Post Office Department study now being made recommends their use.

HILLER'S HELICOPTER: Stanley Hiller's United Helicopters of Palo Alto, Calif., are about ready to begin commercial production of a three-passenger 'copter with entirely new aerodynamic flight control said to give it complete stability.

NEWSPAPERS BY AIR: Congress is giving more than ordinary attention to a proposition whereby America could be sold more effectively to Europe and the world by large scale shipments by plane of U. S. metropolitan newspapers daily to important world areas. They would be delivered to American Government officials, leading foreign newspapers and hotels.

PROOF of MORE OPPORTUNITY for you than ever before in Aeronautical Engineering





Right now there are more aeronautical engineering projects under way, and scheduled for the future, than ever before. Opportunities for the aeronautical engineer grow greater, grow broader, day by day. Spectacular progress in aviation is being ushered in by Flying Wing design, jet and rocket propulsion, gas-turbine engines, sonic and super-sonic speeds, atomic power, and many other still-secret developments.

All this means more opportunity than ever before for YOU. Creative-minded, or practical-minded, there is a place for you in Aeronautical Engineering, with its many types of duties . . . in design, research, development, and production. The door is wide open for making original contributions to the progress of Aviation . . . for reaching the heights of personal achievement . . . for gaining security and success.

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AIR POWER
BEGINS WITH
MODEL AVIATION

BY EVERETT N. ANGUS

AIR Power is Peace Power—Air Power Begins With Model Aviation.

That's the latest word from the Air Force, the Navy, the Civil Air Patrol, the Academy of Model Aeronautics, and the American Legion.

How very true these words are! Model aviation is as important to the success of today's overall aviation picture as is a dependable aircraft power plant. Here are the reasons: A short step back in the life of every type of full size aircraft will bring us to its model. Further back are working models of its assemblies and subassemblies. Throughout the world models sculptured in every material will be found in varying sizes in schools, wind tunnels, and such establishments as the Smithsonian Institution.

The toil, the sweat, and the planning that went into each of these have been forgotten, but the effects live on, for the experiences gained enable us to build a better model next time, and eventually a better aircraft. The process is like an endless chain which began years before the first flight of the Wrights at Kitty Hawk, and stretches into the unknown future.

This air age of ours—still so young and groping—seems at last reaching out to the unlimited potential that exists in model aviation. Model building—both the *creative* type which includes research models, free flight, and control-line models, and the *copy* type which includes exhibition and flying scale models—serves aviation many useful purposes. To detail its value to the youth of America is scarcely necessary.

Full scale aviation needs and awaits the young man and woman. The model builder is an aviation enthusiast of the lifetime type. Thousands have enlarged their interest to a point where the light plane and a private pilot "ticket" have become their goal. It's only one step and a job to the A & E rating stage. Modelers, moreover, automatically take to the air and sing loud praises of air travel.

We in model aviation congratulate those farsighted civic, military, and service organizations, teachers, business men and youth leaders who have encouraged and sponsored model airplane designing, building and flying. Such groups and individuals have made invaluable contribution to the progress and defense of the American way of life.

Whether the interest of the sponsor is in the publicity brought him from model clubs and meets, or in the educational aspects of model aviation, his support has been of great benefit to youth and the nation.

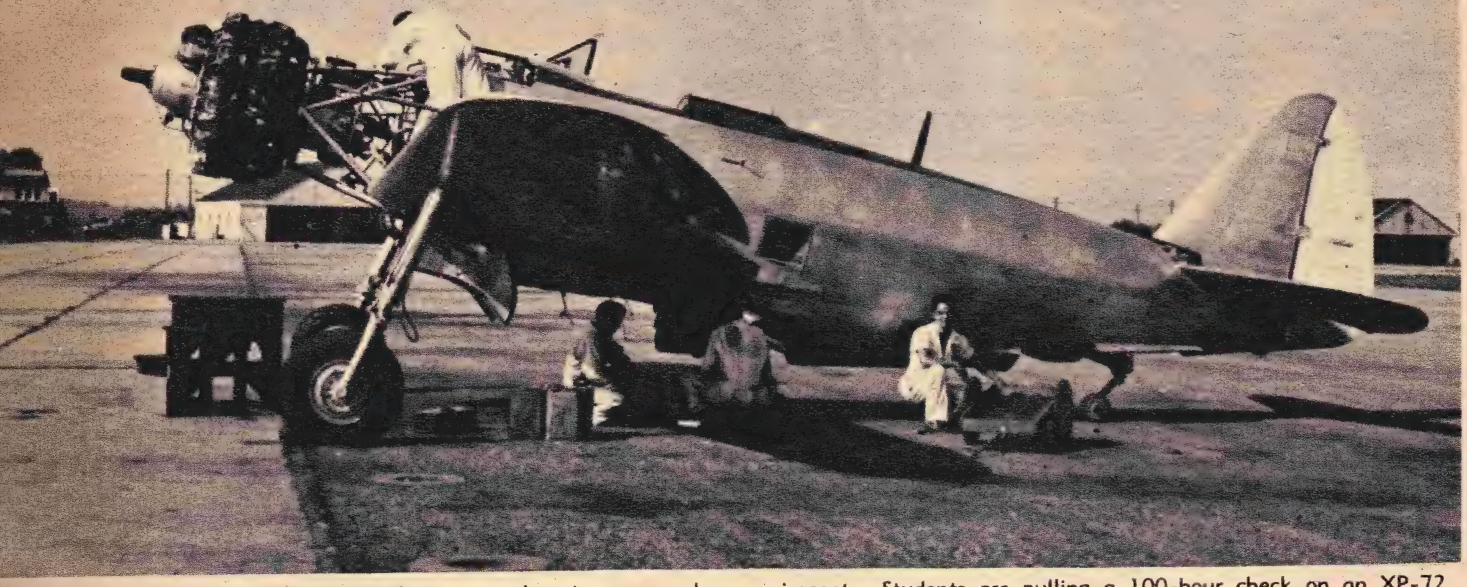
To the country's leaders we say, "Don't sell model aviation short." Any hobby or sport which holds the interest of millions, and educates while it entertains, must never lack backing on the national, state or local levels.

Our air age will grow with greater rapidity and on a firmer footing as we enlarge the scope of model aviation for our aeromodelers. America and aviation can become the greatest peace force on earth if we take advantage of what we now have—the interest, the "know-how," and the aspiration of the model builders.

Everett N. Angus, Oaklyn, N. J., textile engineer noted for his research and patents in fabric-processing, is to model aviation what Billy Mitchell was to military aviation. Mr. Angus' years of field work on behalf of aeromodeling have included numerous appearances before civic and service organizations. He is a past president of the Academy of Model Aeronautics, the governing body for model aviation in America. He was wartime Contest Board chairman for the AMA, and is now serving as Vice President of the National Aeronautic Association's Air Youth Division. Besides modeling activity, Mr. Angus flies his own Stinson 165.

AVIATION CAREERS INC.

BY JOHN F. MASON



● Future A and E mechanics are learning on modern equipment. Students are pulling a 100-hour check on an XP-72.

IN THIS NEW ERA, A MAN WITH SOLID EDUCATIONAL BACKGROUND HAS THE BEST CHANCE FOR AIR CAREER

"WHAT are my chances for getting a job in aviation?"

Is that what you are asking yourself? It is the stock question put by every new student at Long Island's Roosevelt Aviation School for Aircraft "A" and Aircraft Engine "E" Mechanics. And it's a good question. School Director Frank J. Pollard's answer is significant not only to future aviation mechanics but to everyone in, or planning to enter, the field of aviation.

● Roosevelt Aviation School where 765 eager young men are getting a solid foundation for future careers in aviation.

"The answer depends on you," is the way Pollard (World War I pilot, with 35 years' aviation experience) usually begins. "And here's why: The new era in aviation is no longer just around the corner. It's here. It came with the DC-4, the Constellation, and the DC-6. The first jet plane wrote the message across the sky.

"The days of the grease-ball mechanic are over. A man today can't walk in with a background acquired by stripping down his Model-T Ford and expect to get a job trouble-shooting the hydraulic system of a Constellation. This is the age of specialization. To fit into it requires a thorough background in theory as well as practical application."

Fortunately for aviation, as well as the nation, Mr. Pollard's viewpoint is now shared by educators, by industrial men in all fields, and by the thousands of students throughout the country attending accredited schools for mechanics.

Seventy-five percent of the 765 students currently enrolled at Roosevelt Aviation School are former Air Force mechanics. Although these men acquired sound experience in the Army, the scope of their knowledge is limited in most cases to only one phase of a mechan-

ic's job. They are now broadening this wartime training into the more general experience that will later pay off.

Of the student mechanics who enter Roosevelt, approximately ninety percent will pass the CAA exams and become fully licensed "A" and "E" mechanics. These men may then choose a specific branch of aviation: airlines, non-scheduled airlines, flying schools, repair shops, fixed-base operators, or aircraft manufacturers. A few will sign up with large corporations that maintain their own air transport facilities. A small number will go with government agencies (like the CAA). Some will become instructors. An immediate job is the aim of almost all students. However, a few are taking the course as preparation for a college degree in aeronautical engineering.

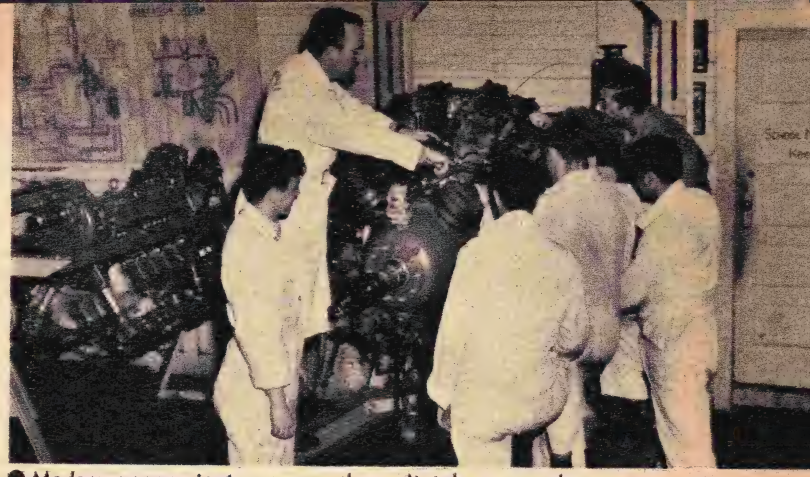
Vincent R. Mangia, 21-year-old ex-Sea Bee, from Mt. Kisco, New York, plans to go back to Mt. Kisco or nearby when he graduates and start out with a fixed-base operator. He prefers to take his chances for advancement in a new outfit, than to run the risk of "getting lost" on some assembly-line. Other students, however, figure it the other way. They feel that a large airline or manufacturing company will provide bigger and better experience.

One of last year's graduates, Leonard C. Prentice, Jr., now working for Sikorsky Aircraft Corporation, at Bridgeport, Conn., endorses the latter theory. Speaking for the sizable contingent of Roosevelt School graduates with whom he works at Sikorsky, he claims that rotary wing aircraft is a good field for a new man to enter.

Roosevelt's young, aggressive Director of Admissions, W. J. Brunick, screens every new student in a private interview before he enters school. Brunick follows the student's progress as closely as possible and is available for counselling at any time. Although two years of high school make a man eligible for training, some companies are now requiring high school diplomas as well as ratings. Brunick strongly advises as much advance schooling as possible, especially in mathematics, physics, and English. "Mechanics, nowadays," Brunick points out in regard to the need for English and basic composition, "have more reports to write up than they used to. They must be able to absorb highly technical manuals, which needless to say are getting increasingly complicated, and should be able to translate technical instructions into action. And, if they hope to become lead mechanics someday, they must be able to interpret these instructions to men working under them.

Both "A" and "E" ratings can be earned at Roosevelt Aviation School, each requiring 24 weeks, or 48 weeks in all. Either course can be taken first, or only one taken. But almost no one takes one without going on to the other. Each course is divided into six four-week phases. This enables a new class to start out every four weeks except for two two-week vacations during June and December.

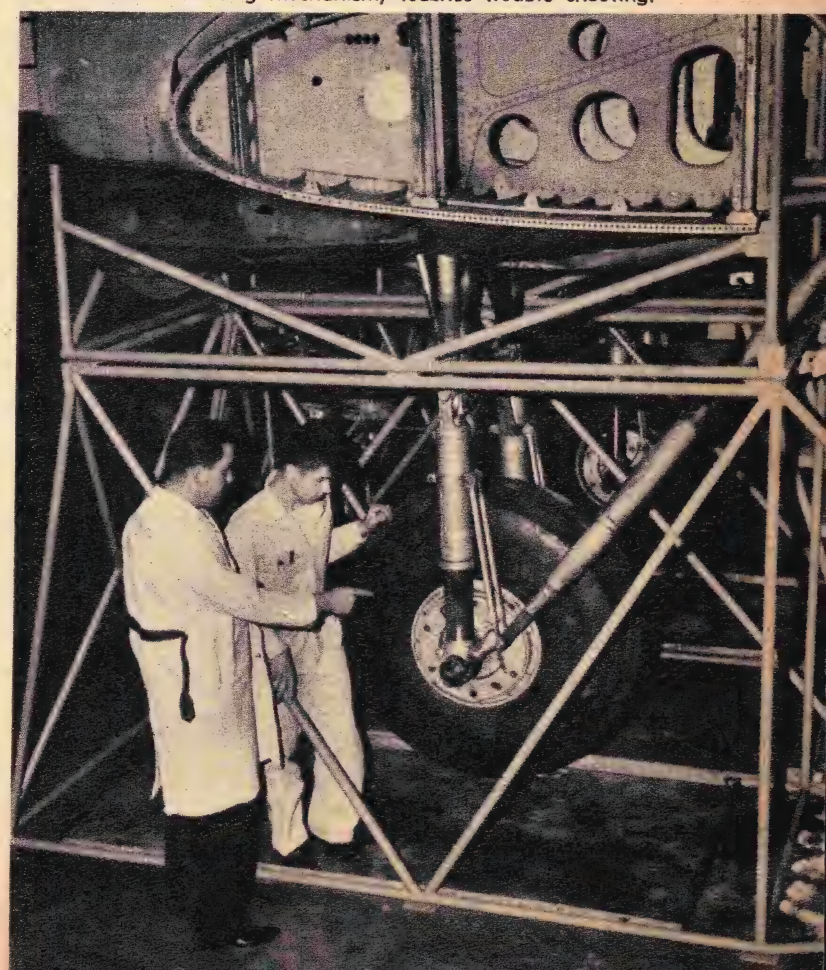
Phase 1, *Basic*, is the same in both the "A" and "E" courses and doesn't have to be re- (*Turn to page 70*)



● Modern power plants are complex. It takes a good man to locate trouble in the lubricating system of such an engine.

● An entire four-week phase is devoted to aircraft wood work. Each student group must build an airworthy wing panel.

● An elaborate mock-up of a DC-3 retractable landing gear demonstrates retracting mechanism, teaches trouble shooting.



WE PREVIEW THE WHEELAIR 111A

BY JOSEPH H. WHERRY

HERE IS AN INTERESTING PERSONAL PLANE THAT OWES ITS EXISTENCE TO A DESIGN CONTEST

A NEW twin-boom pusher, the first four-place personal plane to incorporate the increasingly popular two-control system, is now piling up air hours under the guiding hands of veteran Boeing test pilot Marvin Michael, and the famous Elliott Merrill of B-17 and B-29 days. Looking forward to production now, Puget Pacific Planes, Inc. already has a backlog of orders totalling some 2,000 ships. Importers in both Canada and France have expressed their interest in the Wheelair with large orders, and distributors all over the U. S. and South America are eagerly looking forward to the new all-metal ship that may prove to be the style setter for the family size personal plane.

Designed by Donald J. Wheeler, former Boeing design engineer, the new ship is the outgrowth of the plans which won fame and fortune in an international professional design contest held some two years ago. There were 3,345 entries in that event from every major aircraft manufacturer in this country and from twelve foreign nations. The Wheelair topped them all and is now the center of interest in west coast aviation circles.

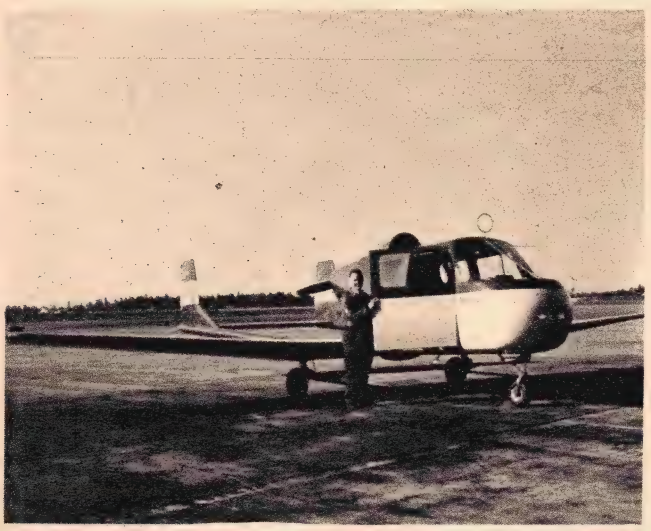
Probably no aircraft since the old Hammond "Y" has offered so many innovations to the personal pilot. The two principal considerations around which any airplane is designed, performance and stability, have

been worked out to a fine degree in the Wheelair. Where performance is too often the main consideration, Wheeler has sought to give the public a medium sized ship which will feature stability and ease of control without sacrificing performance. The result is an easily handled four-place job with a cruising speed of 125 mph, using only 75 percent of the available power of the 190 hp Lycoming. Full gross weight is a shade over 2,500 pounds.

The Wheelair is a very clean ship, although such innovations as flush riveting and retractable undercarriage have been dispensed with in the interest of economy and weight saving. Since the design permits a very short landing gear, the fixed type was decided upon so that many other features could be added without straining the pocketbook and without impairing overall performance to any great degree.

At first look we were struck by the unusually large body cross-section, but further inspection indicated that the aft section was carefully planned. One of the old disadvantages common to pusher types is a large frontal area immediately in front of the prop, but the lines of this ship, together with the design of the air scoop, have resulted in a body or nacelle of near teardrop perfection.

The power loading, 13.1 pounds per bhp, is lower than that of most planes of the same general class. The results are a high rate of climb (see Performance and Weight Data), excellent take off and landing performance, and a high service ceiling. A very efficient structural design results in a low empty weight with no sacrifice of strength, and a gross weight wing loading of slightly under 14 pounds per square foot.



● Pusher location of engine and prop permits low slung landing gear. Note landing lights mounted in nose of plane.

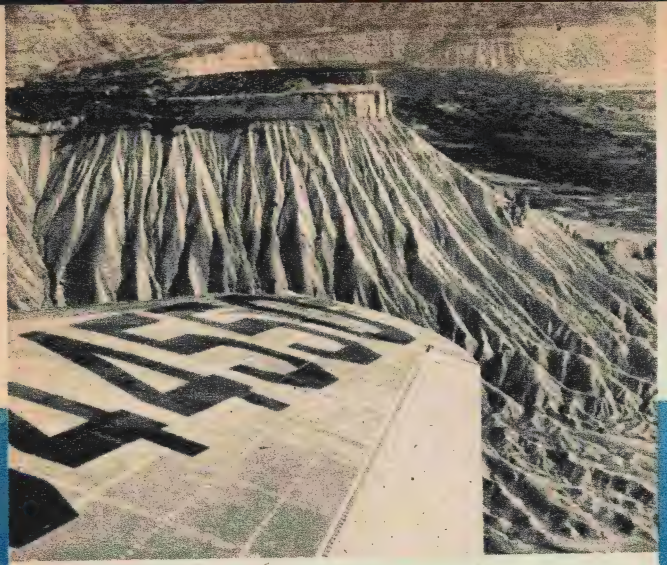
Longitudinal stability on a ship of this type demands a fine balancing of the *stabilizing* empenage moment arms, areas, and aspect ratios against the *de-stabilizing* effects of the wing and fuselage. The knots in this problem were successfully removed and the result was a center of gravity location at about 40 percent of the chord (center section) to the rear of the leading edge of the wing with the control column in neutral position. The body of the Wheelair projects far in front of the CG and thus presents an obstacle to both directional and longitudinal stability. However, the aspect ratio of the horizontal tail surface is fairly high, and as a matter of fact the placing of the vertical fins causes them to act as end plates. This feature in company with moderate tail areas and length finally results in a high degree of stability from all standpoints.

Returning to the CG, we find that this factor is located quite high, almost up to the half-way mark in fuselage depth. Therefore a happy medium had to be struck between tail length and area. The final decision was that a long tail length and reasonable area would achieve the desired results. Here is where many pusher designs have met with difficulties: Extremely large tail area have often been combined with short tail length (or moment arm), and such arrangements have almost always resulted in an aerodynamically great tail download. In other words, the great weight of the large tail surfaces has caused such aircraft to fly at a higher lift coefficient, with accompanying greater drag and loss of payload. In addition to the lighter tail download of the Wheelair, the length of the moment arm also reduces the combined negative effects of the propeller backwash and wing downwash. And speaking of propellers, it is well to notice the fact that the forward (in relation to the propeller) position of the CG causes the propeller lift to provide a stabilizing force when pitching occurs. This effect is small, of course, but it is one point in favor of the pusher design.

In the past few years engineers for the most part have come to favor a fairly high aspect ratio in the design of vertical fins. It has been definitely proven that a slender fin of reasonable height offers greater directional stability over a low fin of the same area (model builders take note). Examples of applications of this train of thought could be (*Turn to page* 78

● Cabin spaciousness and liberal baggage allowance of 160 lbs. make the Wheelair an ideal plane for long flights.

WINGS FOR YOUR CAMERA



● Out of an airliner at 8000 ft. Camera: Speed Graphic, 1/500 sec. at f:8. Med. yellow filter, fast panchromatic.

Few men in photography have achieved the distinction of Hans Groenhoff. Besides being a photographer "par excellence," Hans is also an artist in the field. The striking beauty of his photographs interprets dramatically the feeling of flight, and his portraiture of aircraft is symbolic of power, speed, adventure, and excitement. His love of aviation finds expression in his photographs. Groenhoff is an accomplished power plane and glider pilot, and his stick time in powerplanes is counted in hundreds of hours.

BY HANS GROENHOFF

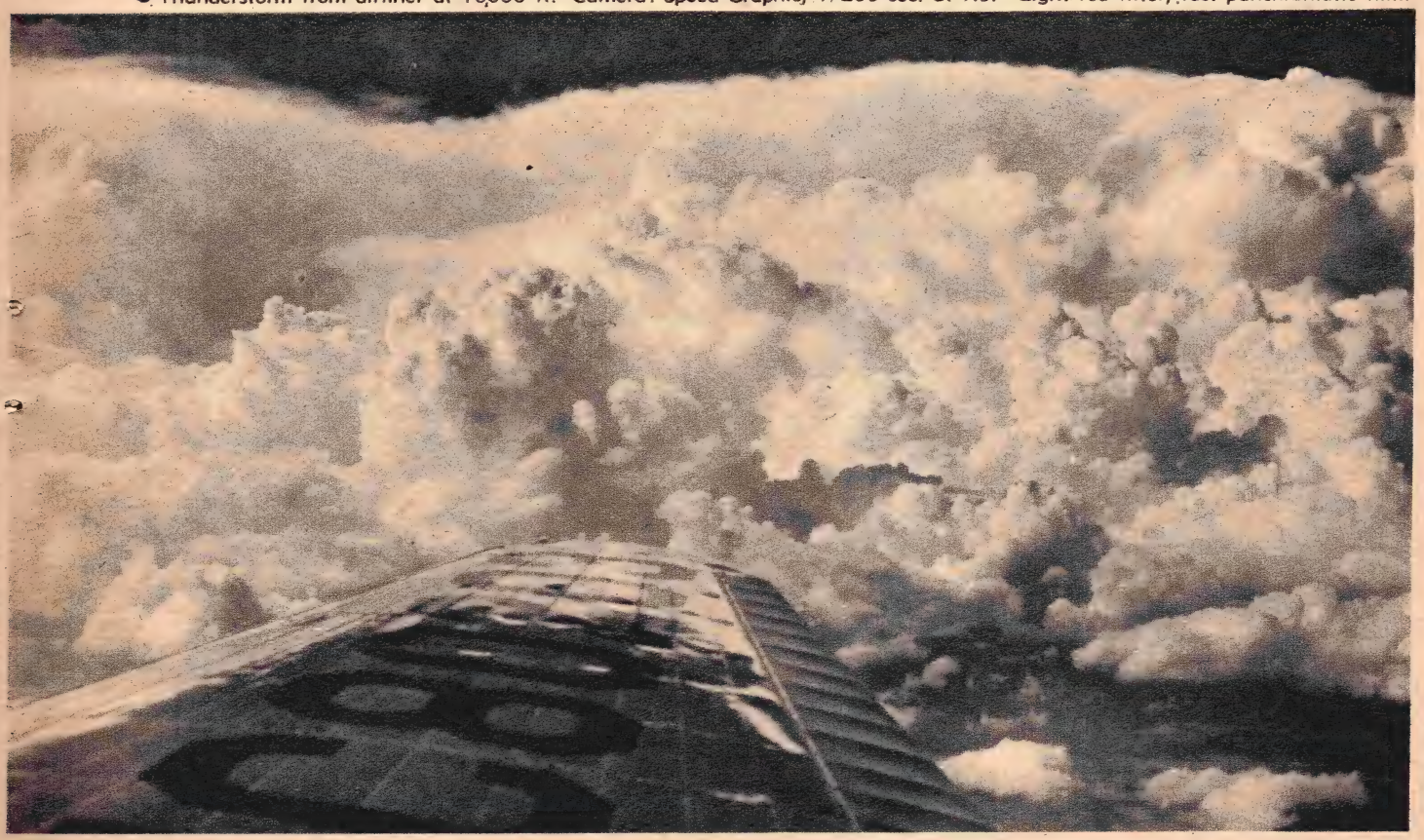
AVIATION'S MOST FAMOUS PHOTOGRAPHER DRAWS ON HIS EXPERIENCE TO GIVE YOU SOME SOUND ADVICE

THE airplane has opened a vast new realm for the camera enthusiast. There is drama, action, and romance in flying. There is rich beauty in the ever-changing moods of the sky. The face of the earth, with its natural wrinkles and man made furrows, presents a spectacle of constant wonder and excitement from the airman's detached viewpoint in the sky. Speed is the symbol of flying, and air views change with the inevitable swiftness of flight. Only the camera, with its sensitive film and quick shutter, can hold the sights of the flier as they change and pass rapidly under his wings.

Aerial photography is as old as the airplane itself. But the intricate equipment and the special technical knowledge it has required in the past has always had a bewildering effect upon the camera enthusiast, who was led to believe that this branch of photography could be pursued only by the expert technician equipped with special aerial cameras. However, with the recent

● Through the open door. Altitude 12000 ft. Eastman Medalist camera. 1/100 sec. at f:8. Light red filter, fast panchromatic.

● Thunderstorm from airliner at 10,000 ft. Camera: Speed Graphic, 1/200 sec. at f:8. Light red filter, fast panchromatic film.



● Denver, Colo., from the air. Camera: Eastman Medalist, 1/200 sec. at f:8. Medium yellow filter, fast panchromatic.

● Ground patterns from 5000 ft. Camera: Speed Graphic, 1/200 sec. at f:8 using orange filter, fast panchromatic film.

● Shot by author at 12000 ft. while piloting Piper Supercruiser. 1/200 sec. at f:16, orange filter, fast panchromatic film. An excellent example how struts and wing form a frame for clouds.

growth of travel in big airliners and the small personal plane, the airman and his passenger found out readily that no special skills or equipment were necessary for pictorial photography in the sky.

Equipment—Cameras

With very few exceptions almost any popular hand camera may be used in flight photography. Inasmuch as in the air both the camera and the subject are always in motion, speed and ease of manipulation are the most important considerations in a choice of camera. The smaller the camera, the easier it will be to manipulate in the cramped space of most airplanes. From the 4 x 5 press camera on down to the 35 mm miniature, all are usable for picture taking in the sky. Bellow-less cameras are to be preferred, because the soft leather enclosure may easily be damaged, or even blown off, if exposed to the powerful slipstream through an open window of the plane.

In case a camera with bellows is to be used extensively in the air, it would be advisable to equip it with a rigid metal, plywood, or plastic sleeve which may be slipped over the bellows and attached firmly to the camera box. The top part should be slanted down so it will not interfere with the view finder, and the inside surfaces should be painted with a dull black lacquer or with lampblack so they will not throw reflected light into the lens. If a bellow camera is to be used without a sleeve, it is best to keep it out of the slipstream, but if it must be exposed, it should be turned so that the baseboard under the bellows faces into the wind.

Reflex cameras, which have gained much popularity among amateurs and professionals alike during recent years, may be found awkward to sight in the air unless they are equipped with a special direct view finder. As in any other branch of photography, an efficient direct view finder is essential in flight photography. If the camera should not be so equipped, an accessory sports finder may be purchased and easily installed on any box. Special focusing devices, such as range finders, are not required, except in close-up photography of airplanes in flight. At all other times the distance scale is set at infinity and left there. However, one of the most common reasons why aerial photographs taken with popular hand cameras turn out to be out of focus, is that the camera is jarred and the lens is frequently moved out of focus by the constant vibration in the plane. The infinity setting should be checked at frequent intervals during flight. In amateur photography, where pin point detail and extreme definition are not called for, the small 35 mm miniature camera has many advantages, chief among which are its compactness, ease of handling, and lack of bellows. It is an ideal camera to be carried at all times by the private pilot and air traveller.

A built-in body shutter release is desirable. However, a cable release is satisfactory, if taped securely to the camera body or the baseboard. (*Turn to page* 80)

BY C. B. COLBY

COME in quickly and shut the door before someone sees me and takes a pot shot in my direction. I've had two folks after me since we met last month—one an expert who speaks with plenty of authority, and one a quaint character from Yadkinville, N. C. You will be interested in both their letters. The expert's makes good sense and gives some sound advice; the other provides a few laughs. Let's look at the latter first.

Remember the blast I ran in the November issue about that idiot in the J-3 who buzzed the Connecticut farmhouse? Well, this chap from North Carolina takes me to task for "expressing yourself a little freely before thinking the matter over."

He continues: "I gather from the article that your life and the lives of your wife and child were not endangered by the maneuver, so what are you griping about? Your article sounded as though you were mad because you can't stunt a plane like that." This character goes on to tell about hiring a pilot (?) to take him up and buzz his own house last summer, ". . . because I am not a pilot and don't know much about flying." (Who would ever guess?)

For a moment I thought he was planning to join the Solo Club, but then I read his last paragraph and stopped worrying. "I am not qualified to join the Solo Club," he says, "because I never soloed an airplane. (Pray he never does!) But even if I were qualified, I wouldn't join a club which has a director (who, me?) who uses half a magazine article to criticize someone more daring than himself!" Now let's look at the intelligent letter.

This second, long and highly interesting letter is from A. H. Knouff, Lt. Comdr., USNR, way out in Tucson, Arizona. Mr. Knouff is a veteran instructor, and he really goes to work taking apart the comments I made on the CAA's suggestions for landing at a strange field. He has some mighty sage comments of his own to make, backed up with a lot of experience. Listen to this:

"I don't like the idea of approaching a field at 1500 feet because if there are any large aircraft such as the B-24's or B-29's circling the field you are likely to be right amongst them at that altitude. (*Turn to page* 93)

IMPROVED FLIGHT TRAINING

BY GEORGE R. REISS

A FLIGHT CURRICULUM TO KEEP STUDENTS INTERESTED AND EMPHASIZING PRACTICAL USE OF THE AIRPLANE

YOU the private pilot! Remember, when you were working for your pilot's ticket, how you detested the monotony of practicing hour after hour those precision maneuvers such as S-turns, figure-eights, rectangular courses, and practice landings on your home air field?

Remember how the repeated stalls and spins wrapped your sensitive tummy into knots; and how you dreaded those simulated forced landings—until you were about ready to chuck up the whole business?

Remember, you wondered why all that was necessary, just to get a ticket? All you had wanted was to fly straight and level. You just wanted to use your plane to go places. You could think up so many more interesting things to do than those maneuvers, hour after hour. A cross-country, perhaps. And you even had to fight off the temptation to break the monotony with a little buzzing.

Well, that type of flight training seems slated for the ash can. At least, it'll get a more minor role in future flight training curriculum, for private pilots at least. Maybe there still will be a place for it—for training commercial pilots.

And now a new and much more practical curriculum of training, one emphasizing the practical uses of an airplane and shunting away the emphasis on the dangers of flying, seems on the way in. With Civil Aeronautics Administration blessings, too.

Currently, this new curriculum is undergoing tests at Ohio University at Athens, Ohio. It's getting a pretty thorough workout, one designed to bring out all the bugs and shortcomings. It puts all the emphasis on drilling into a student's brain all those practical things a pilot must know to fly cross-country well and safely, takes away the emphasis on precision maneuvers and stalls and spins. They—the stalls and spins and maneuvers—will still be in, but in a much more minor role. A role so minor in fact that it will be hard to find them at all.

And if the new training methods really work? Well, the old methods, in use since the virtual beginning of aviation, probably will be chucked overboard, and hurriedly, too.

This new wrinkle in private pilot training is mainly the idea of C. E. A. Brown, dynamic state director of aviation in Ohio. And it has been dressed up a lot with the ideas of some top hands in the CAA training field—George W. Vest, CAA's third region administrator; Charles E. Cox, Jr., an old timer who learned

to fly in Italy in World War I and now is assistant to Vest for personal flying development; John Geisse, another old timer in CAA for personal flying; John F. Guilmartin, chief of flight personnel and agencies division.

Brown has a lot of background in aviation training in Ohio. He started with the CAA's Civilian Pilot Training Program before the war; switched to the War Training Service, and since then has had a hand in passing on Ohio Schools with G.I. training programs. And he, for a long time, has been imbued with the idea that there's something wrong with present training methods, that they somehow miss the boat, and that there's a lot of basis for the old criticism: "We learn to fly one way to get a pilot's certificate, and another way to use it."

The present training methods, Brown feels, do a negative sales job for aviation. They over-stress the dangers. They constantly build up in a student the subconscious fear that something dangerous, something too difficult for him to cope with, is about to happen—a real forced landing, an unexpected stall or spin. And that frightens out of aviation the type of person that the aviation industry most urgently needs, to prosper.

"If aviation is ever going to amount to a hang," he says, "it must reach the type of fellow (*Turn to page 99*)

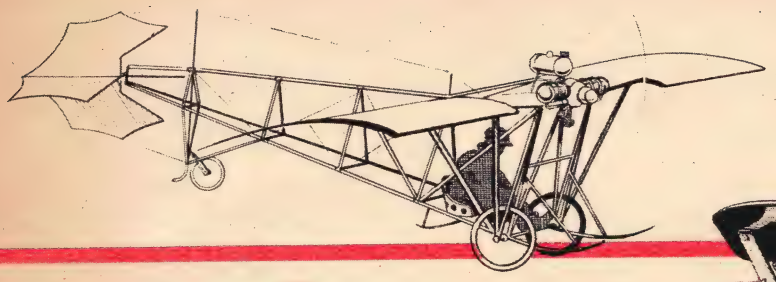
● Crossed controls, if abused, will send embryo pilot into a spin without warning. Proper training makes maneuver safe.

● It is rarely that a pilot will put his craft into such stall attitude. Most stalls occur when pilot is unaware of his plane being stalled, such as in slow flight, especially during turns, as visual references under these conditions do not spell trouble.

● Above. Part of the proposed curriculum is devoted to cross-country flying. The student learns navigation at an early stage.

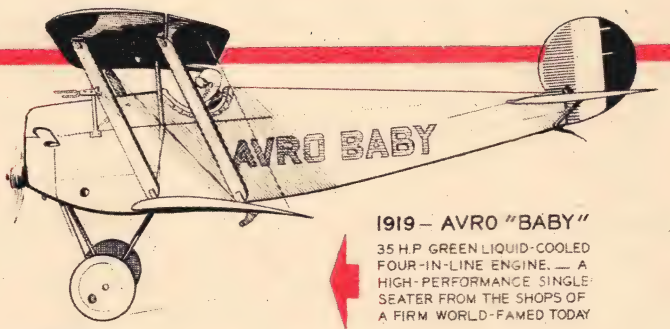
● Below. Landing in strange fields prevents localized habits, improves landing pattern and technique, adds to flying safety.

AIR PROGRESS



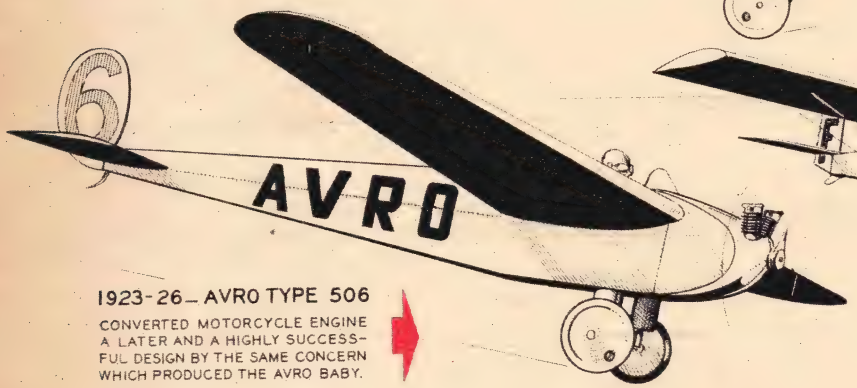
1908—SANTOS DUMONT "DEMOISELLE"

30 H.P. DARRACQ LIQUID-COOLED FLAT TWIN ENGINE. FORERUNNER OF ALL ULTRA-LIGHT AIRPLANES, THIS TINY CRAFT WEIGHED LESS THAN 250 POUNDS AND, THOUGH TRICKY TO FLY, PERFORMED WELL WHEN IN THE HANDS OF EXPERIENCED (AND PINT-SIZED) PILOTS



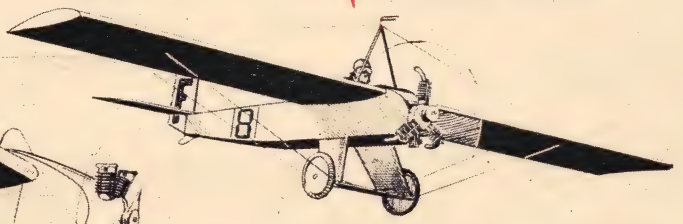
1919—AVRO "BABY"

35 H.P. GREEN LIQUID-COOLED FOUR-IN-LINE ENGINE.— A HIGH-PERFORMANCE SINGLE-SEATER FROM THE SHOPS OF A FIRM WORLD-FAMED TODAY



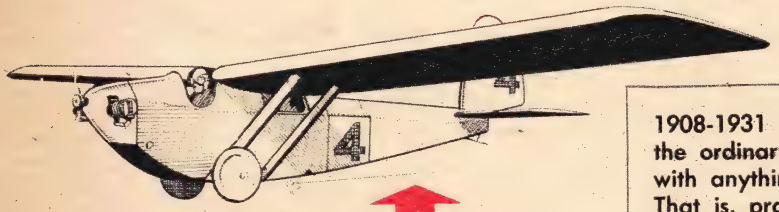
1923-26—AVRO TYPE 506

CONVERTED MOTORCYCLE ENGINE A LATER AND A HIGHLY SUCCESSFUL DESIGN BY THE SAME CONCERN WHICH PRODUCED THE AVRO BABY.



1924—FARMAN "MOSQUITO"

35 H.P. ANZANI AIR-COOLED, FAN-TYPE, RADIAL ENGINE. ONE OF THE VERY FEW TYPES IN THIS CLASS TO MOUNT A GENUINE AIRCRAFT ENGINE IN A PERIOD WHEN CONVERTED MOTORCYCLE ENGINES WERE IN GENERAL USE HERE AND ABROAD



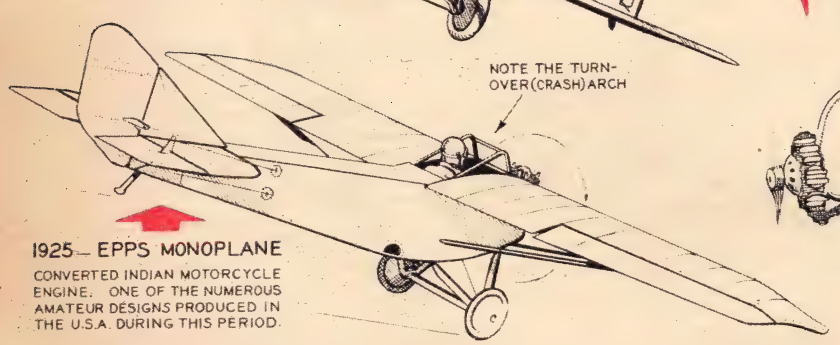
1924—BEARDMORE "WEE BEE I"

30/40 H.P. BRISTOL CHERUB AIR-COOLED FLAT-TWIN ENGINE.— ONE OF THE MOST SUCCESSFUL 2-SEAT ULTRA-LIGHTPLANES YET PRODUCED.

1908-1931 Definition of the ultra-light airplane as opposed to the ordinary light plane is usually based on horsepower rating with anything up to 40 hp forming the ultra-light classification. That is, providing the airplane is adequately powered and not merely *underpowered*. Judged by these standards the first genuine ultra-light airplane was the Demoiselle shown on this page since, despite its low power rating, it was adequately powered in an era when most airplanes were not. Real interest in ultra-light planes dates from about 1922 when many interesting types were developed both here and abroad. In many cases they were the products of top-flight aviation firms. Interest in this class died out at the end of this period although in some cases many of the better designs automatically passed into the light plane class as larger and more powerful engines were installed.

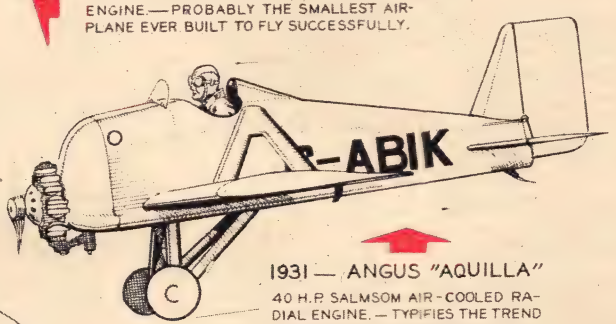
1924—IRWIN "METEORPLANE"

20 H.P. IRWIN AIR-COOLED X-TYPE RADIAL ENGINE.— PROBABLY THE SMALLEST AIRPLANE EVER BUILT TO FLY SUCCESSFULLY.



1925—EPPS MONOPLANE

CONVERTED INDIAN MOTORCYCLE ENGINE. ONE OF THE NUMEROUS AMATEUR DESIGNS PRODUCED IN THE U.S.A. DURING THIS PERIOD.



1931— ANGUS "AQUILLA"

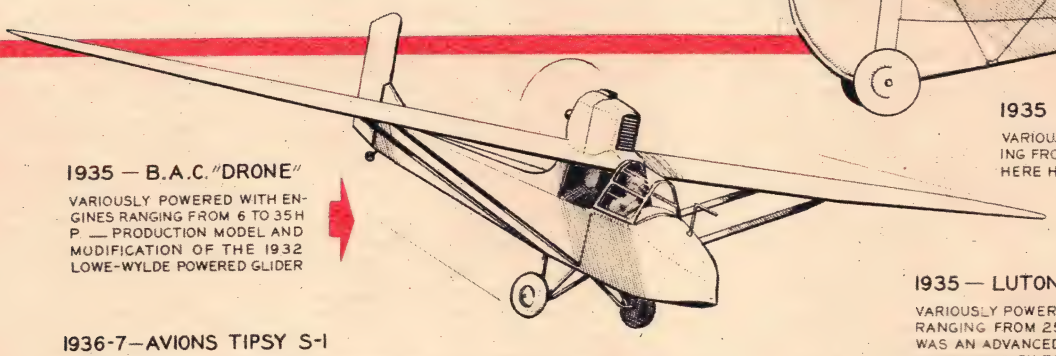
40 H.P. SALMSOM AIR-COOLED RADIAL ENGINE.— TYPIFIES THE TREND TOWARDS GREATER POWER WHICH MARKED THE END OF THIS PERIOD.

BY DOUGLAS ROLFE

DEVELOPMENT OF THE ULTRA-LIGHT PLANE

1935 — MIGNET "POU DU CIEL"

VARIOUSLY POWERED WITH ENGINES RANGING FROM 17 TO 30 H.P.— MODEL SHOWN HERE HAD A 30 H.P. CARDEN-FORD MOTOR



1935 — B.A.C. "DRONE"

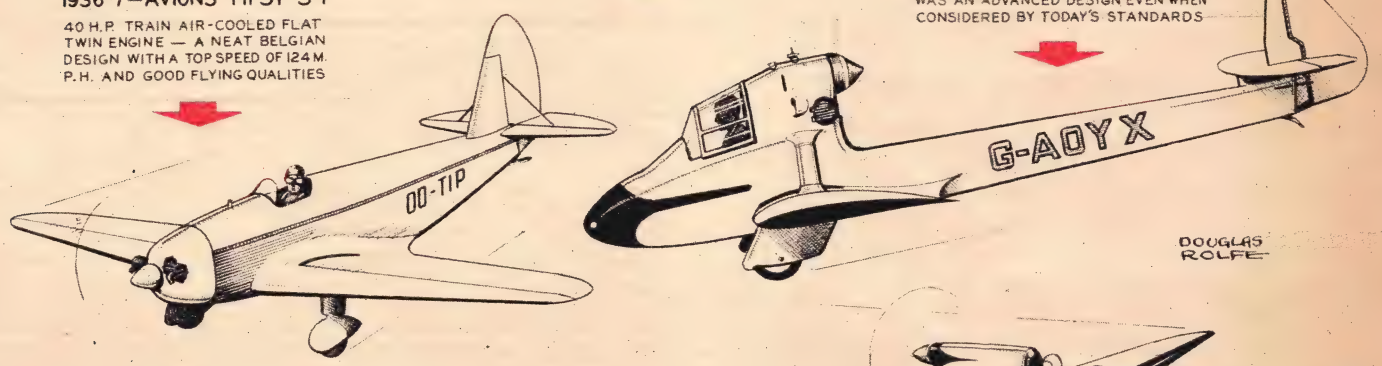
VARIOUSLY POWERED WITH ENGINES RANGING FROM 6 TO 35 H P — PRODUCTION MODEL AND MODIFICATION OF THE 1932 LOWE-WYLDE POWERED GLIDER

1935 — LUTON "BUZZARD"

VARIOUSLY POWERED WITH ENGINES RANGING FROM 25 TO 35 H.P — THIS WAS AN ADVANCED DESIGN EVEN WHEN CONSIDERED BY TODAY'S STANDARDS

1936-7—AVIONS TIPSY S-1

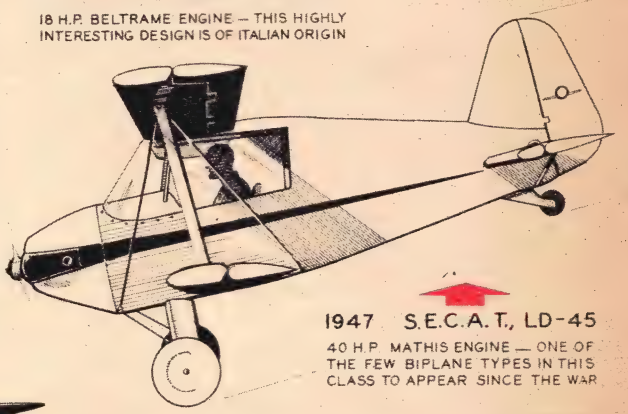
40 H.P. TRAIN AIR-COOLED FLAT TWIN ENGINE — A NEAT BELGIAN DESIGN WITH A TOP SPEED OF 124 M. P.H. AND GOOD FLYING QUALITIES



1935-1948 — Interest in ultra-light airplane design was reawakened in 1935, mostly by the introduction of the Pou du Ciel or "Flying Flea." This completely unorthodox design could be purchased in knock-down form and cost very little money. It was also supposed to be simple to fly but a series of fatal crashes ended the Flying Flea vogue soon after it was introduced and it was grounded in both England and France. Despite this, interest in the ultra-light class continued and many of our best light planes today stem from some of the designs developed early in this period—the Aeronca a notable example. Post-war interest in this class still exists with about 15 or 20 types now in existence—mostly in France. This class has practical possibilities for club training due to its low initial cost and extremely low cost of operating.

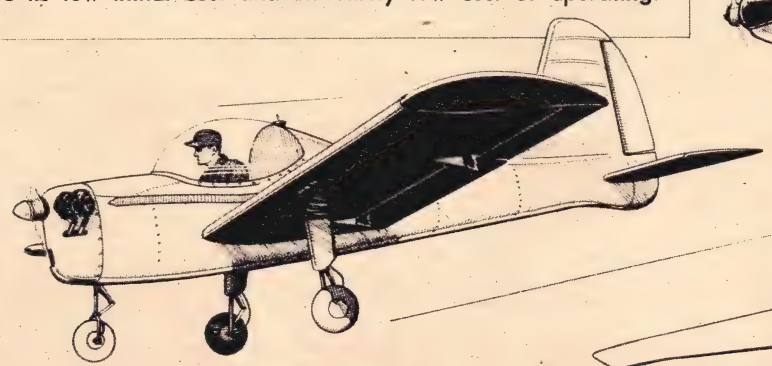
1937 — BELTRAME "COLIBRI"

18 H.P. BELTRAME ENGINE — THIS HIGHLY INTERESTING DESIGN IS OF ITALIAN ORIGIN



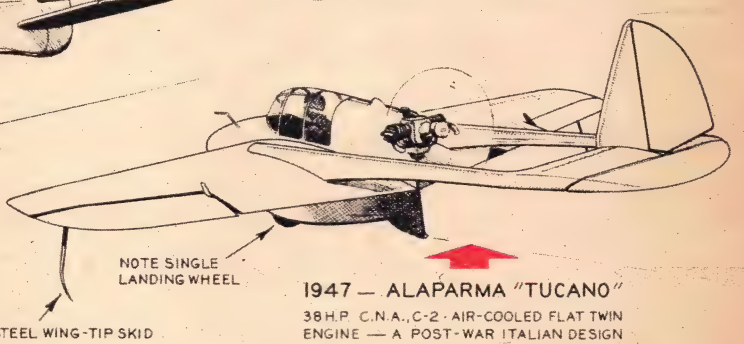
1947 S.E.C.A.T., LD-45

40 H.P. MATHIS ENGINE — ONE OF THE FEW BIPLANE TYPES IN THIS CLASS TO APPEAR SINCE THE WAR



1947 — LOCKHEED "LITTLE DIPPER"

40 H.P. CONTINENTAL ENGINE — A RECENT VENTURE INTO THE ULTRA-LIGHT FIELD BY ONE OF THE TOP FLIGHT AIRPLANE CONSTRUCTION FIRMS IN THE U.S.

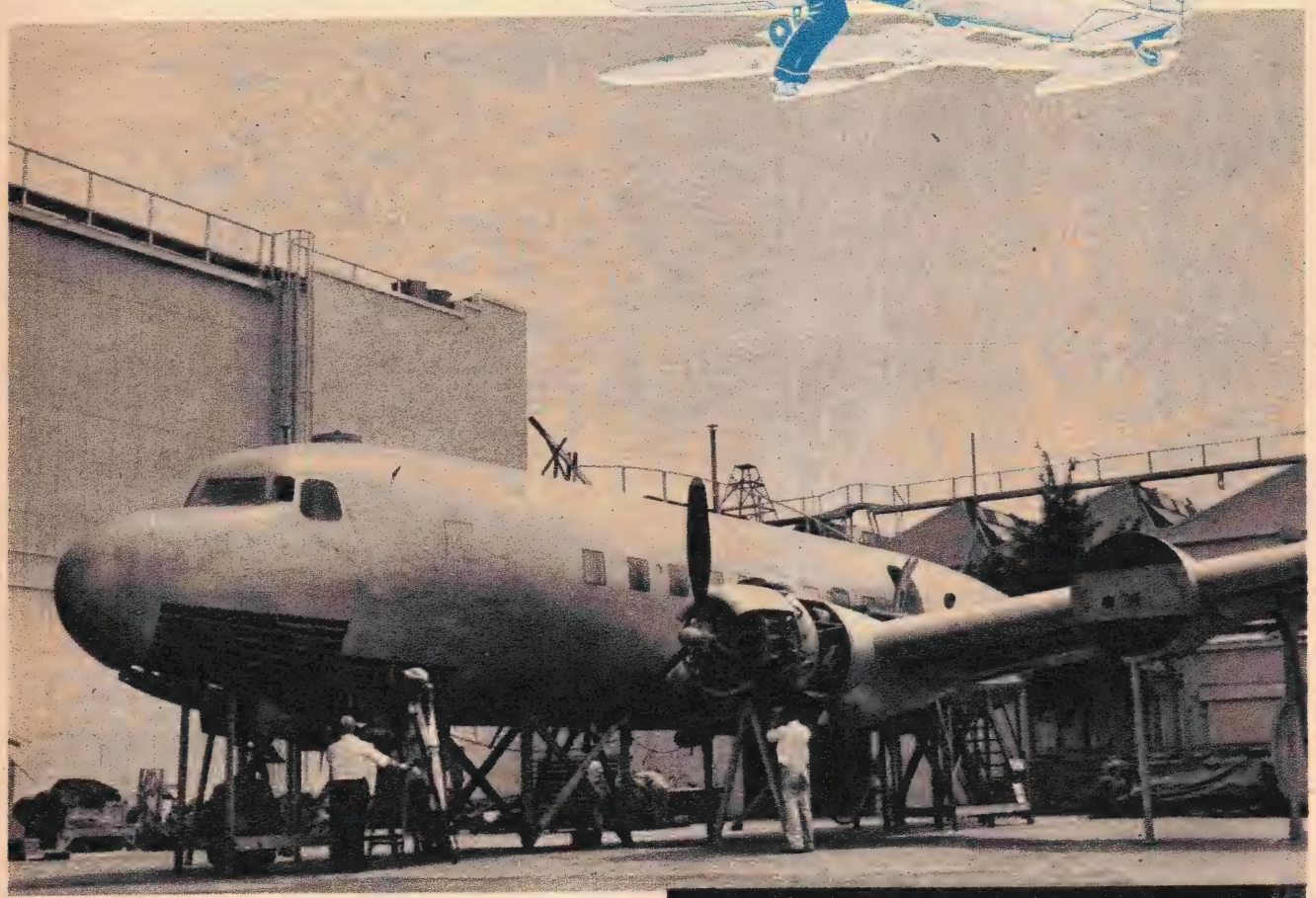


1947 — ALAPARMA "TUCANO"

38 H.P. C.N.A., C-2 AIR-COOLED FLAT TWIN ENGINE — A POST-WAR ITALIAN DESIGN

AVIATION CARPENTERS

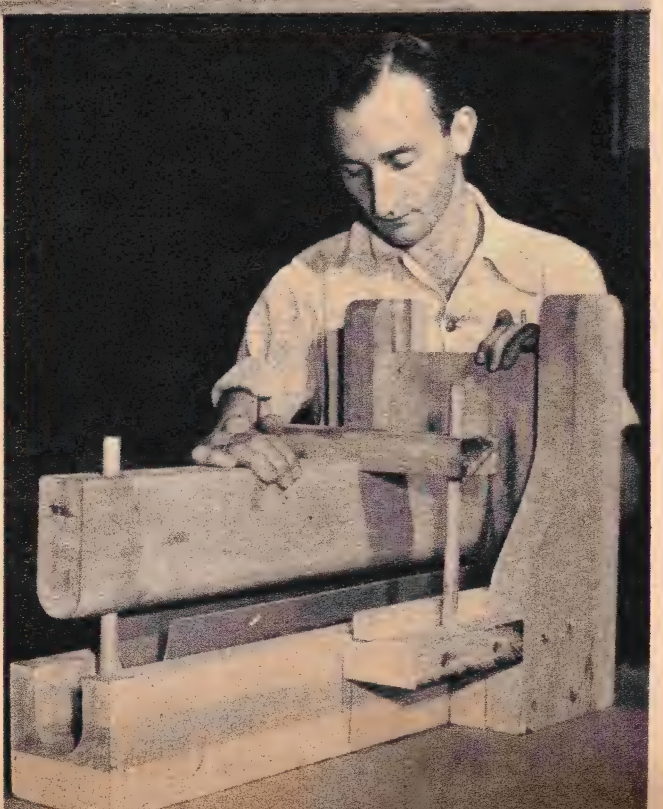
AIR CAREER REVIEW



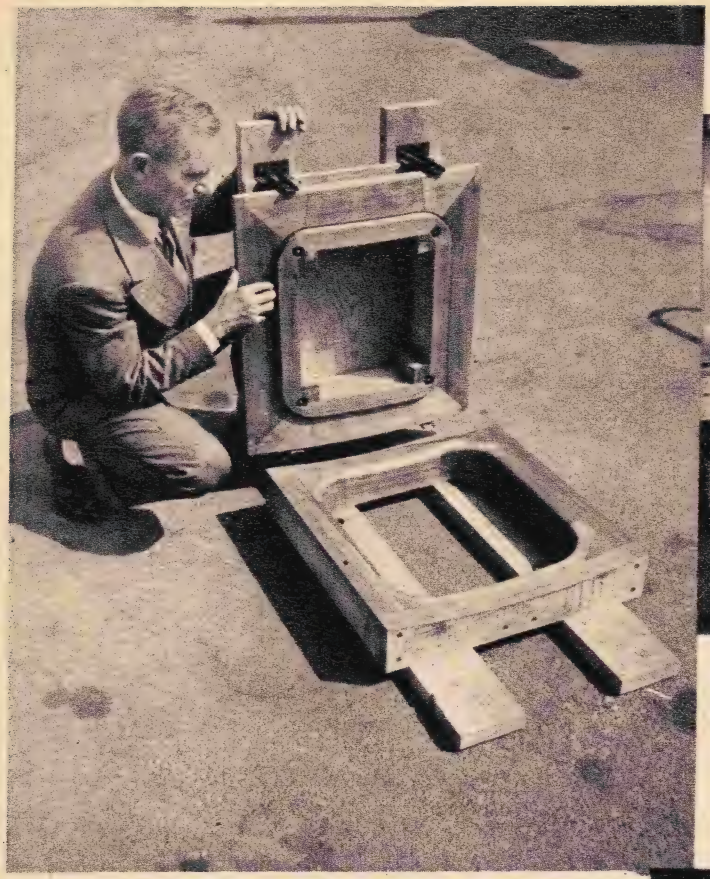
● Gigantic wooden structure duplicates Douglas DC-6. It contains replicas of working parts. Even engines are of wood.

THE advent of the all-metal airplane did not spell doom to the honored profession of the aircraft woodworker, as many have been led to believe. On the contrary, he still occupies an important place in the manufacturing processes of aircraft construction. Hard wood in many instances replaced metal dies. Full sized mock-ups of entire airplanes are used to check interior seating arrangements, cockpit layouts, and various installations of component parts before going into production. This helps to solve numerous problems. Some of the applications of wood in aircraft construction are illustrated on these pages.

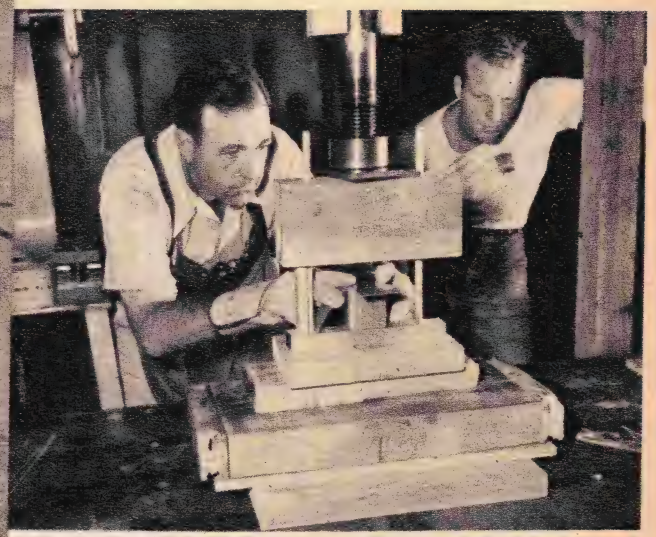
There is a wide field for skilled and semi-skilled carpenters in aviation, as every all-metal military and civilian airplane started out as a wooden mock-up.



● Birch jig, fitted with birch dowel guides, forms U-channel of phenolic plastic, used to cover electric wiring installation.



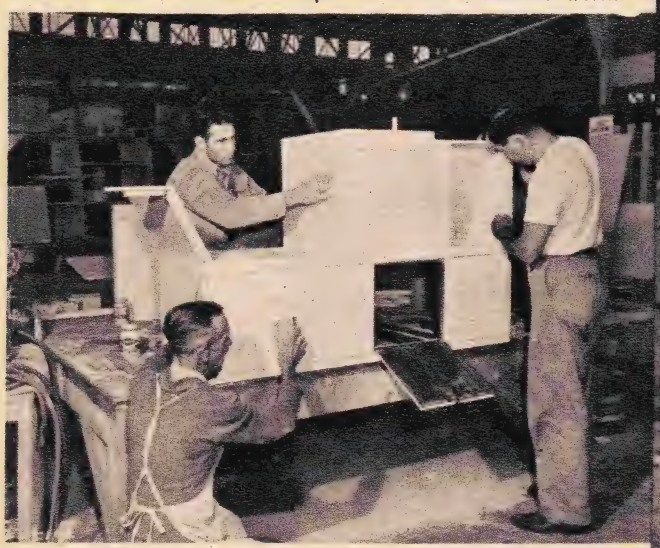
● Complex mechanism represents highest art in aircraft woodworking. Used to form plastic window frames of DC-6.



● Hard wood often replaces metal dies at Douglas Aircraft Co. Phenolic sheet is being formed here into junction box.

● A Douglas Aircraft woodworker digs into a piece of plywood with full sweep gouge. Shape is part of die for tank straps.

● Plywood crew's-locker of the Lockheed Constitution being rubbed down. A fine example of aircraft cabinet work.



● Granddaddy of the YB-49 designed by Northrop in 1923. Plane flew successfully in 1929. Note buried engine.

BY FRANK TINSLEY

DESIGNER'S DREAM

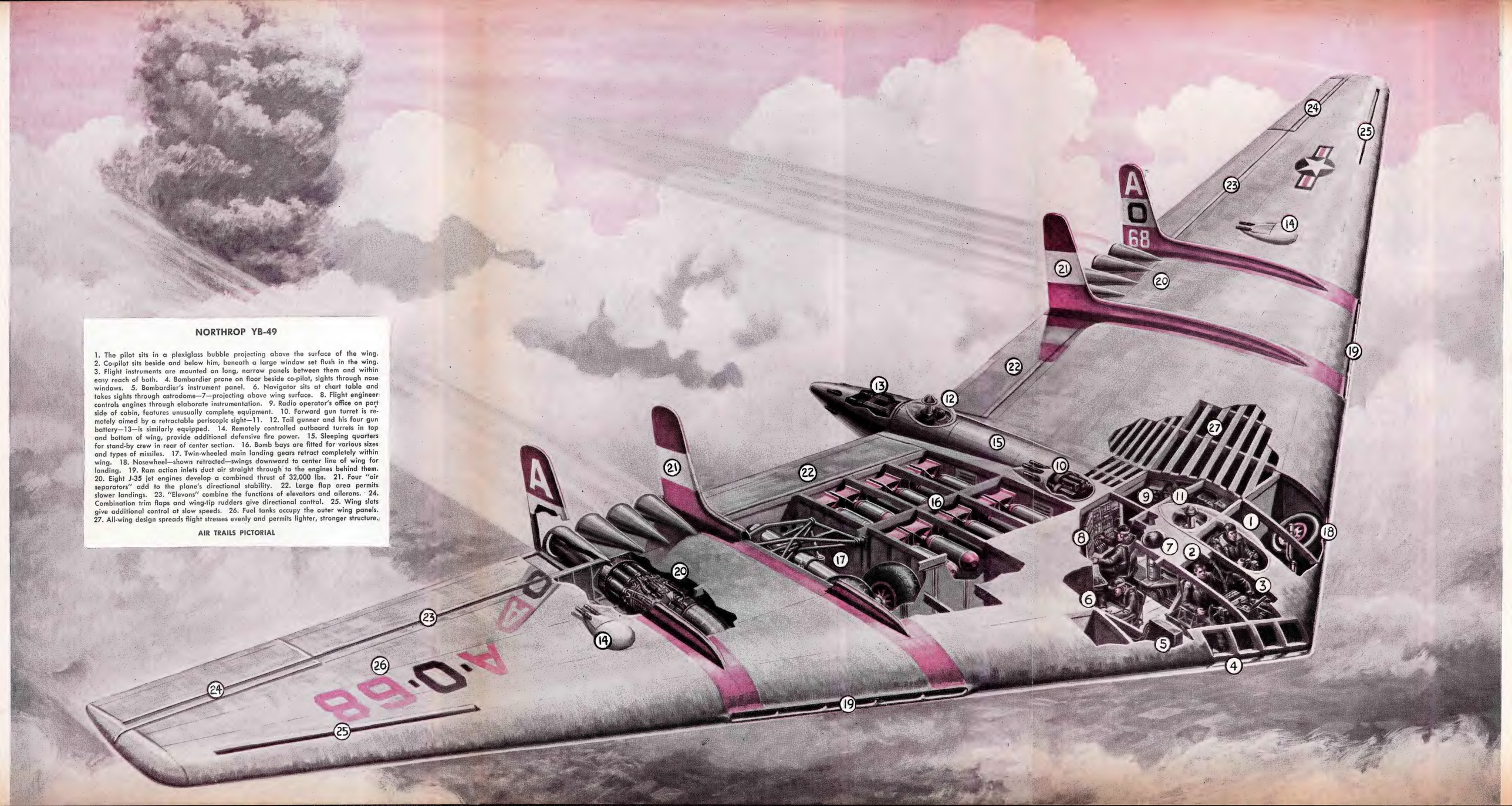
WHEN THE YB-49 LIFTED FROM RUNWAY, AIRMEN WITNESSED THE FINAL FLOWERING OF AN ENGINEERING FLIGHT OF FANCY—A DESIGNER'S DREAM COME TRUE

EVER since the days of stick and wire "crates," logical minded engineers have sneaked off into quiet corners or paused in mid-munch over forgotten luncheon tables to daydream of the perfect heavier-than-air flying machine. An airplane, please God, with no bulbous fuselage or dragging tail, no exposed engines, no built-in headwinds in the form of wire rigging or fixed landing wheels. Just the essentials of flight, power and control. In short, a slick, smooth, slippery FLYING WING!

Some of the characters actually went the magazine artists one better, muttering wildly of jet or rocket propulsion systems that would even eliminate propellers! Of course these were so obviously nutty that the more conservative dreamers smiled condescendingly and looked around for the squirrels, while "practical" airplane builders of the day threw up their hands despairingly and consigned the whole lot of them to the booby hatch!

But the enthusiasts persisted in their folly. A Dutchman named Fokker, unwilling to go on building honest, conventional biplanes, insisted upon designing a cantilever wing, internally supported, needing neither struts nor wire bracing. Another, an absent-minded German professor named Junkers, not only improved upon the idea, but actually had the effrontery to build a whole airplane out of metal!

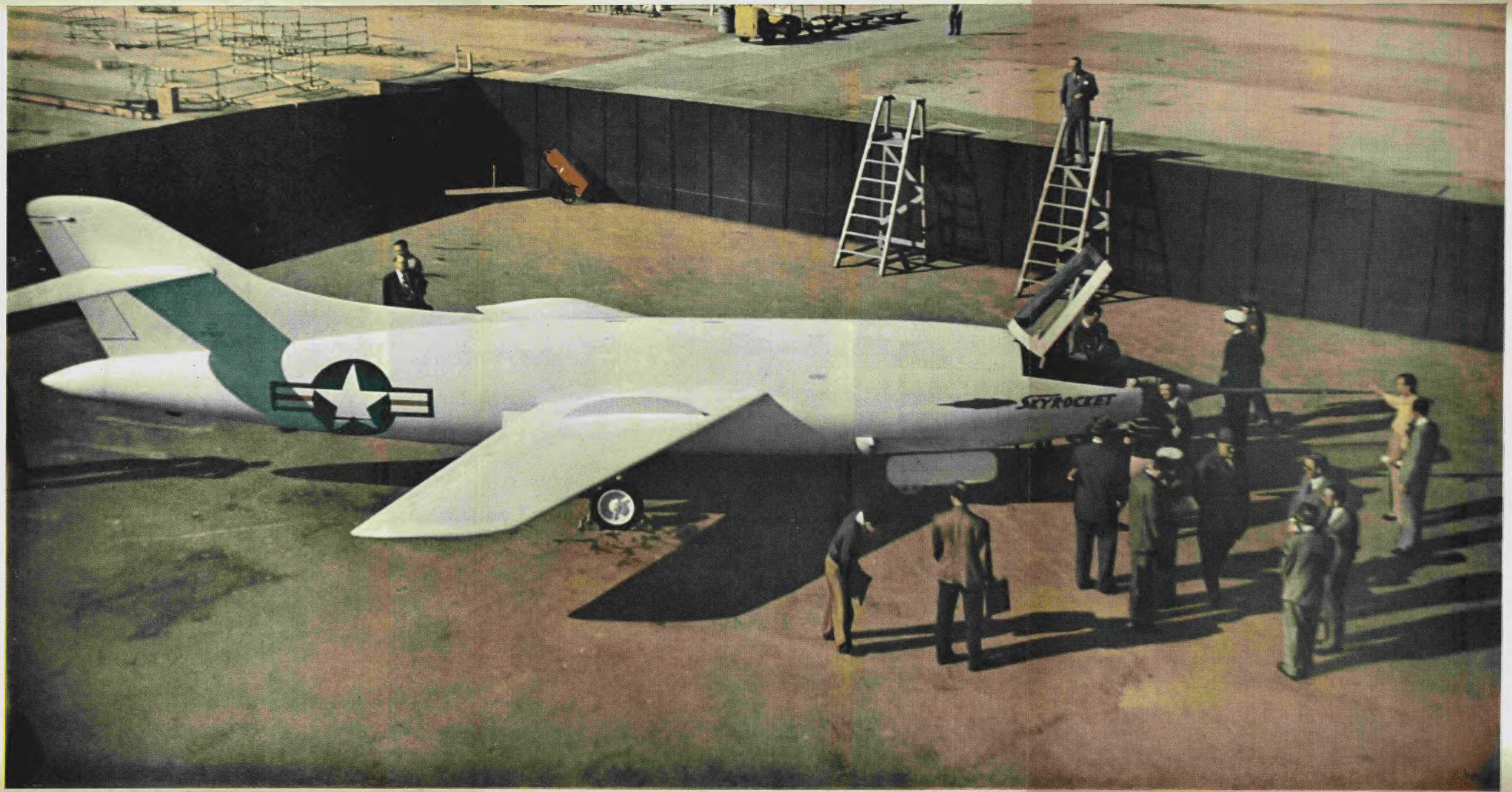
In other parts of the world, other characters were busy with dreamboats. A wild-eyed Yankee by the name of Burgess, teamed up with a crazy Britisher named Dunn and together they designed land and seaplanes without tails, Vee-shaped things (*Turn to page* 85)



NORTHROP YB-49

1. The pilot sits in a plexiglass bubble projecting above the surface of the wing. 2. Co-pilot sits beside and below him, beneath a large window set flush in the wing. 3. Flight instruments are mounted on long, narrow panels between them and within easy reach of both. 4. Bombardier prone on floor beside co-pilot, sights through nose windows. 5. Bombardier's instrument panel. 6. Navigator sits at chart table and takes sights through astrodome—7—projecting above wing surface. 8. Flight engineer controls engines through elaborate instrumentation. 9. Radio operator's office on port side of cabin, features unusually complete equipment. 10. Forward gun turret is remotely aimed by a retractable periscopic sight—11. 12. Tail gunner and his four gun battery—13—is similarly equipped. 14. Remotely controlled outboard turrets in top and bottom of wing, provide additional defensive fire power. 15. Sleeping quarters for stand-by crew in rear of center section. 16. Bomb bays are fitted for various sizes and types of missiles. 17. Twin-wheeled main landing gears retract completely within wing. 18. Nosewheel—shown retracted—swings downward to center line of wing for landing. 19. Ram action inlets duct air straight through to the engines behind them. 20. Eight J-35 jet engines develop a combined thrust of 32,000 lbs. 21. Four "air separators" add to the plane's directional stability. 22. Large flap area permits slower landings. 23. "Elevons" combine the functions of elevators and ailerons. 24. Combination trim flaps and wing-tip rudders give directional control. 25. Wing slots give additional control at slow speeds. 26. Fuel tanks occupy the outer wing panels. 27. All-wing design spreads flight stresses evenly and permits lighter, stronger structure.

AIR TRAILS PICTORIAL


SKYROCKET

● This 16 lb. gadget having an output of 40 refrigerators cools cockpit of the Skyrocket.

OLD NEEDLENOSE

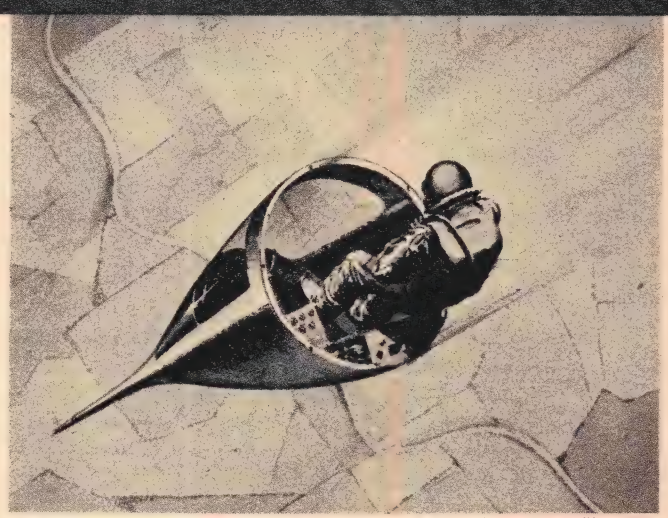
BY ANDREW R. BOONE

THIRD TYPE OF ULTRA-FAST AIRPLANES, THE DOUGLAS SKYROCKET IS DESIGNED TO EXPLORE SUPERSONIC SPEED

SUPERSONIC flight by full-scale man-carrying aircraft may soon become reality.

One more candidate for the honors is the Douglas D-558-2 Skyrocket, needle-nosed successor to the Douglas D-558 Skystreak. Unlike the jet-propelled Skystreak, Skyrocket carries both a jet engine and liquid rocket engines. Officially, the slender airplane is stressed to withstand the forces it will encounter at a speed of Mach 1. (Speed of sound: 761 mph. Sea level at temp. of 59° F.). Unofficially, it is confidently expected by those in the know that its magnesium body can absorb the blows forced upon it by somewhat higher speeds.

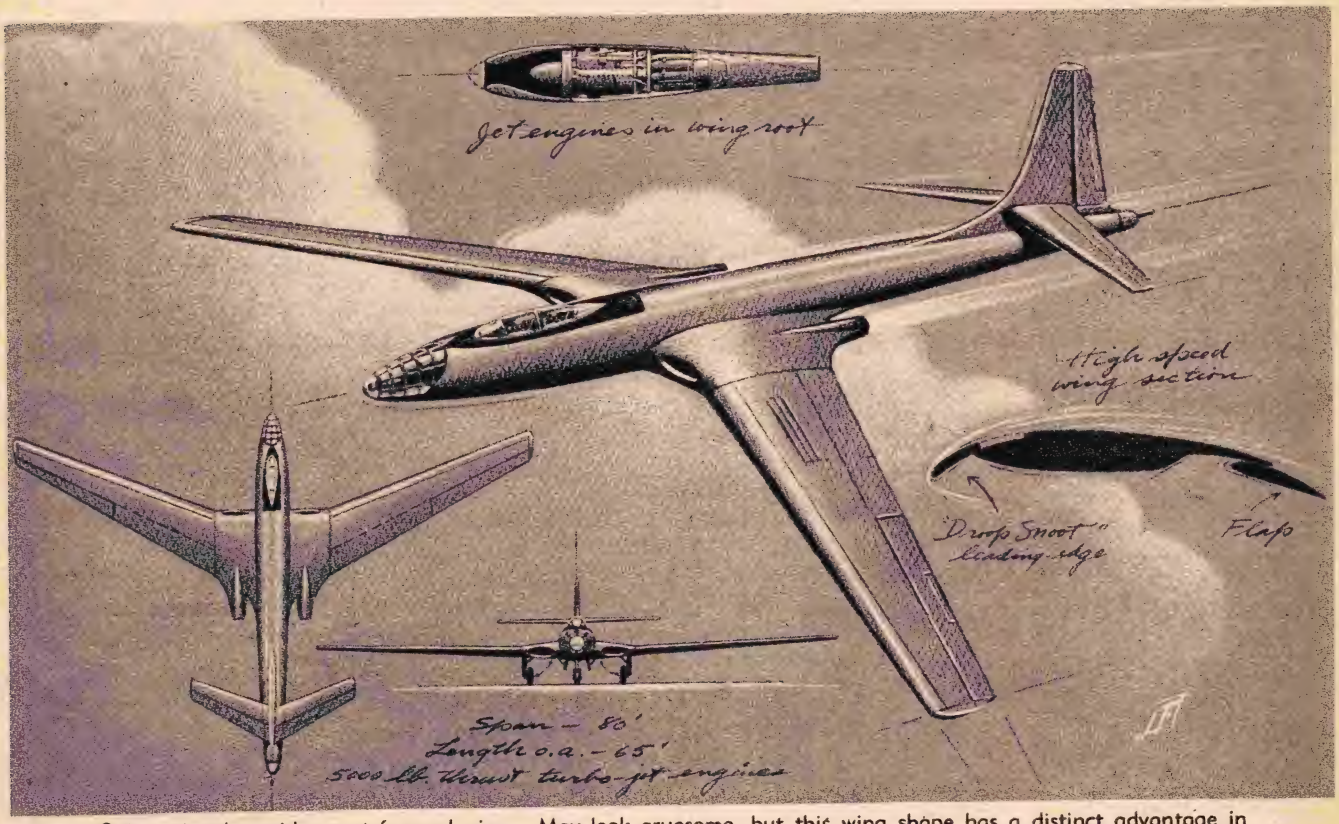
The Skyrocket, built by Douglas for the Navy and ready for its test paces by NACA pilots flying from the AAF's Test Center at Muroc Dry Lake on the California desert, had not been flown when these lines were written. Although tests will be conducted at various altitudes and conditions of flight, a typical test run will see the airplane take off with only the turbojet in operation and climb to 25,000 (*Turn to page* 90)



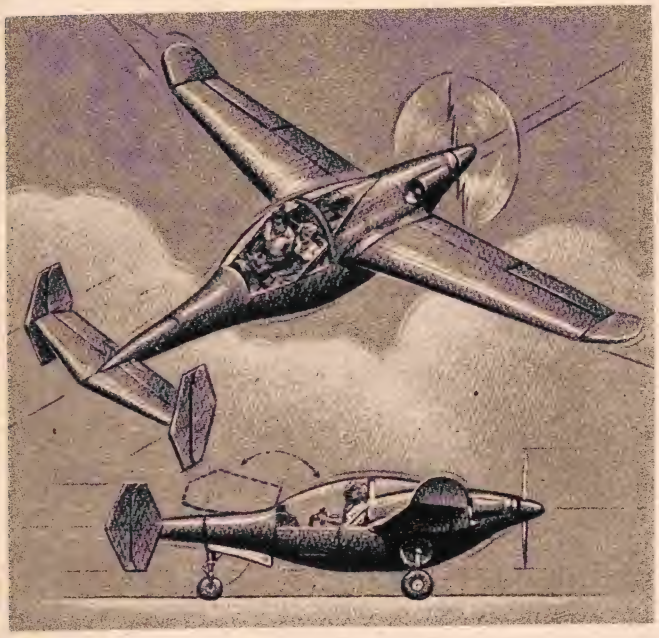
● In emergency, a jettisonable cockpit protects the pilot after its release until a safe speed for parachuting has been reached.

AIRMEN OF VISION DESIGN COMPETITION

See rules on page 76



● A jet bomber with swept forward wing. May look gruesome, but this wing shape has a distinct advantage in high speed airplanes as it is more stable laterally than the swept back configuration, does not suffer excessively from tip stalls, and does not need tip slots. Bomb load can be carried directly on CG. Note high speed airfoil.



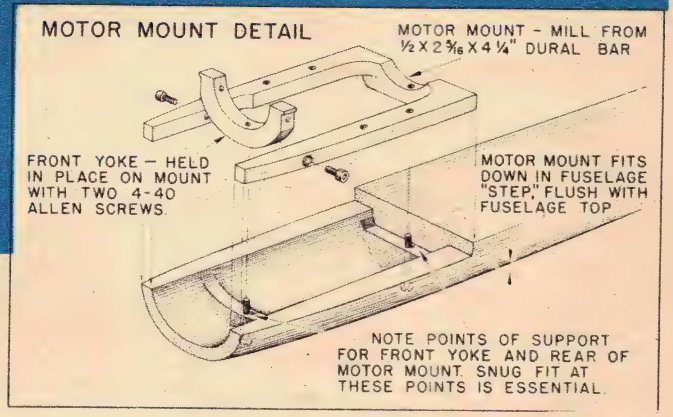
● Canard type personal plane. Tail-in-front airplanes are not new. The Wright brothers' machine was one. The location of tail surfaces offers numerous advantages, as the tail does not ride in the wake of the wing. Stall characteristics of the Canard are good too, as the tail stalls ahead of the wing.

● Here's an idea for a clean Goodyear Trophy midget. Location of the propeller considerably reduces drag caused by the slip-stream swirling past the fuselage. The location of the engine behind pilot also adds to streamlining. The 85 hp power-plant is cooled by fan which draws air through small duct.

WORLD'S FASTEST MODEL: SNOWFLAKE

BY BILL VIETS

● Author-designer Viets with his record breaking speed job.

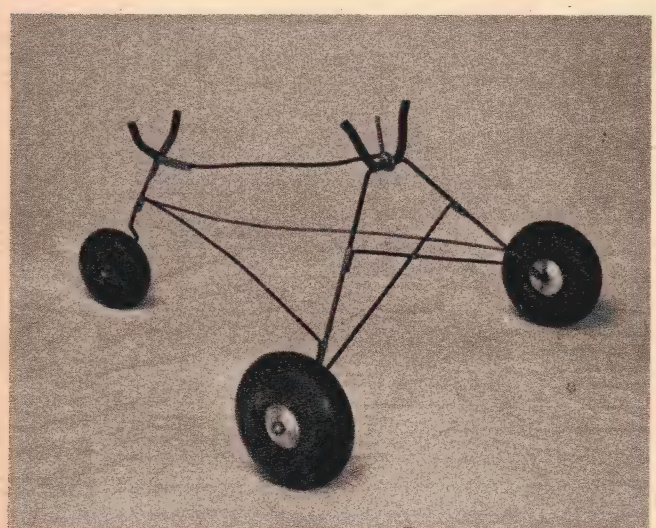


A FASCINATING ACCOUNT OF HOW THIS RECORD BREAKING DOOLING-POWERED CRAFT SET A 143.82 MPH MARK

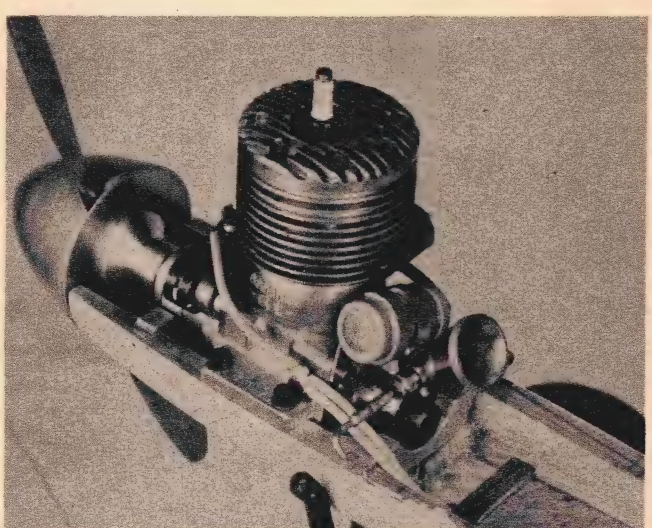
THERE have been many designs for speed jobs in the last several years that have proved flyable and popular. This ship is a combination of some of the better features of all these, and utilizes several theories which have been worked out during the last two seasons.

Until this plane was built, the writer had been attempting to "beat the experts" in wing design. There was a rapid succession of knife-edge, paper-thin wing sections, high aspect-ratios and a general desire to get away from the beaten track.

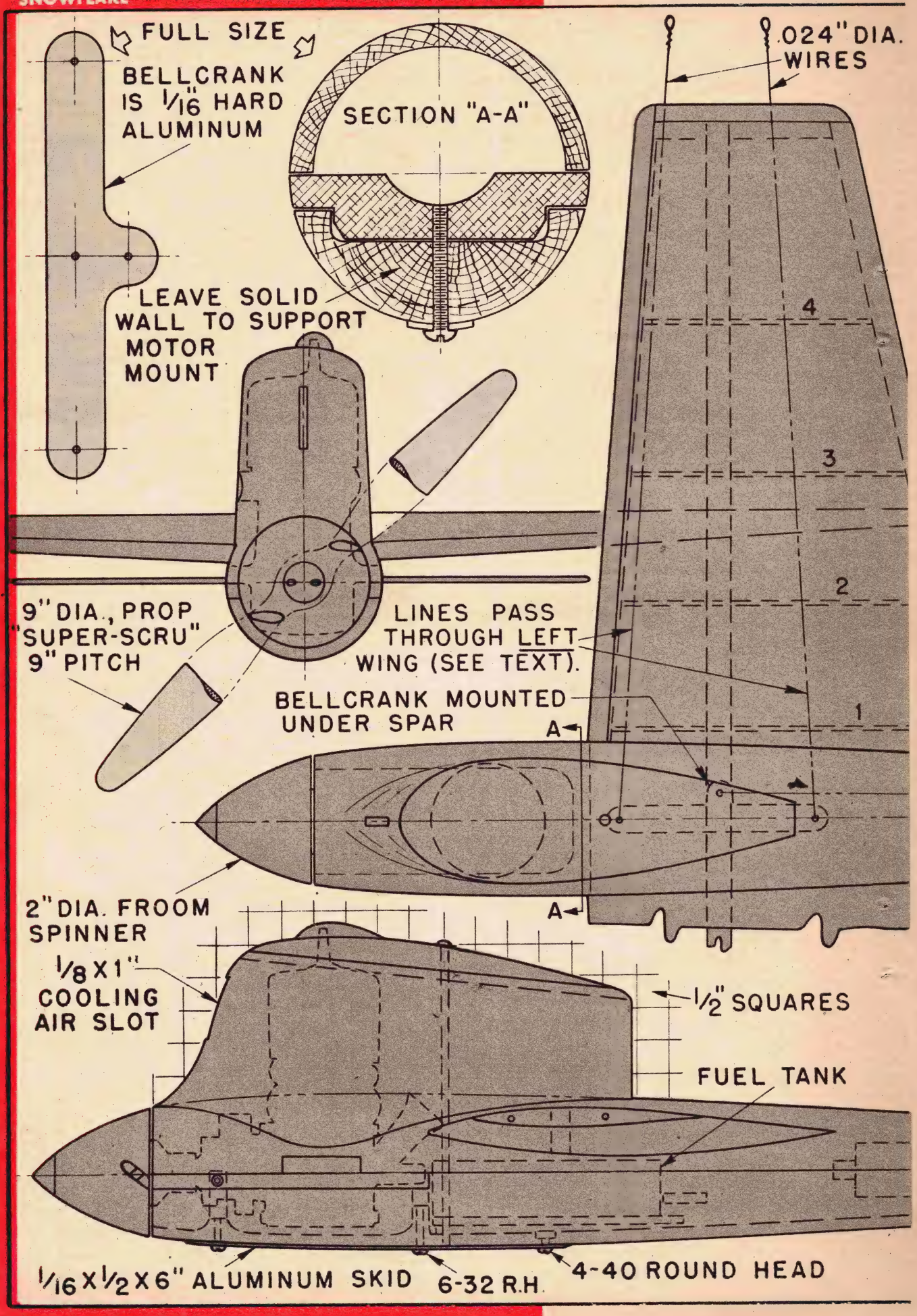
However, when the new Dooling 61 engine became available in the East, it was decided to settle back into the more normal design of wing and merely incorporate some constructional and mechanical features which had been gathered from its forerunners. In the first place, the new Dooling is 5/16" shorter than other similar engines and mounts on 2" centers and has a long crankshaft to permit very close cowling. The only changes to the engine were to file off the exhaust stack so that the cowl port could completely encircle (*Turn to page* 101)

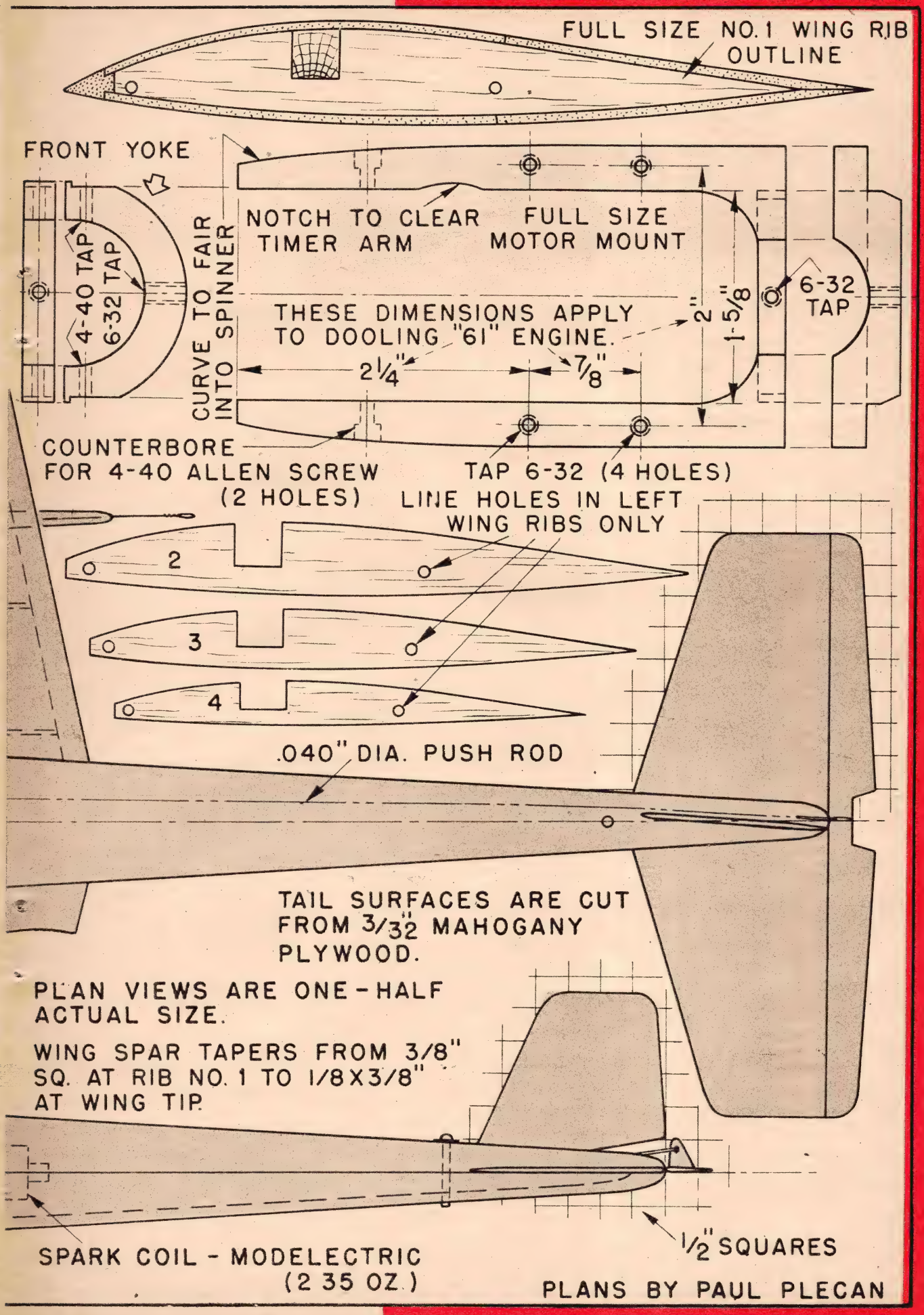


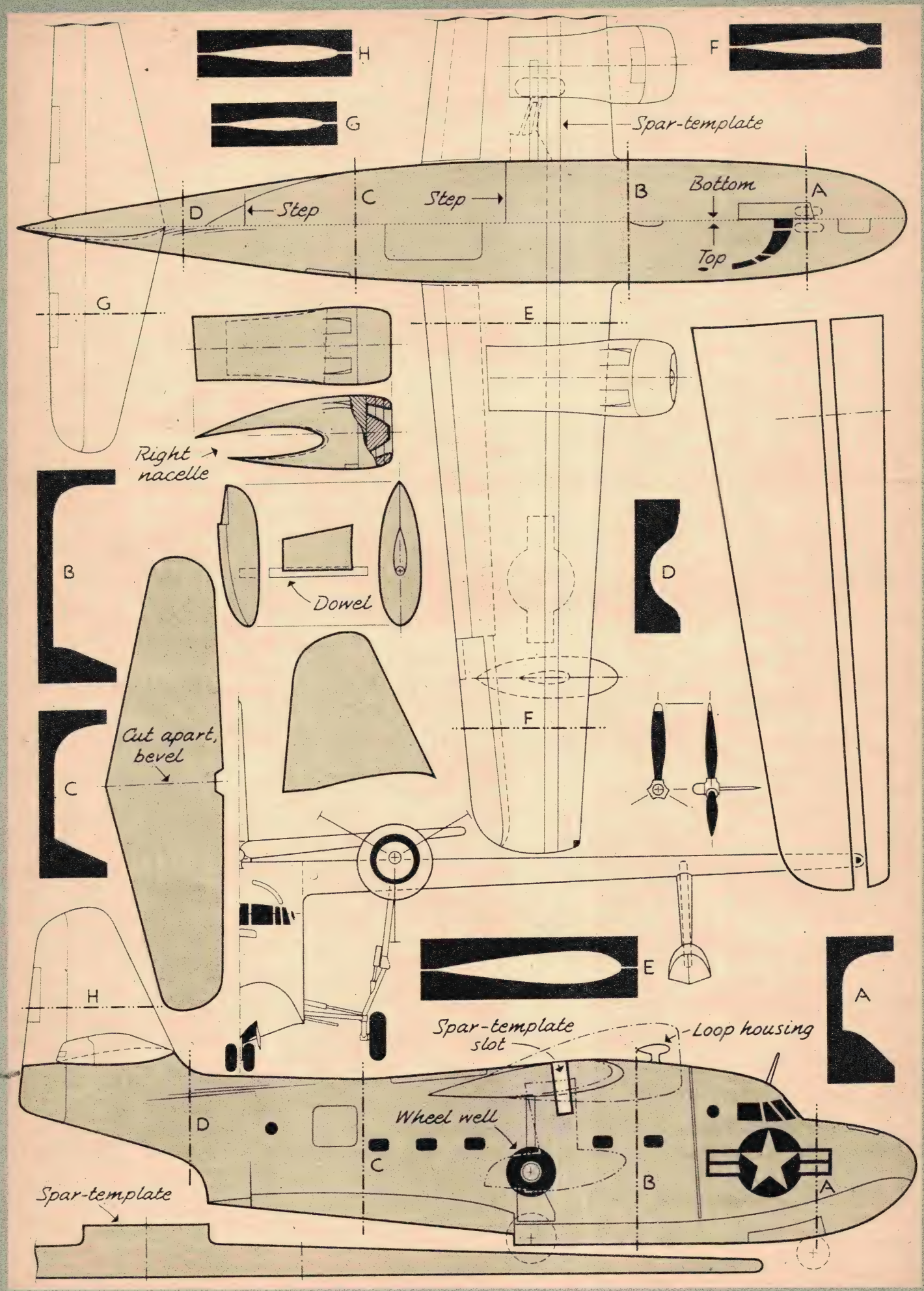
● Details of take off gear are shown here. Even if you don't build the model read the excellent comments on dollies.



● Mounting of the engine and ignition set-up is simple and fool-proof. Mr. Viets has some splendid ideas in his article.

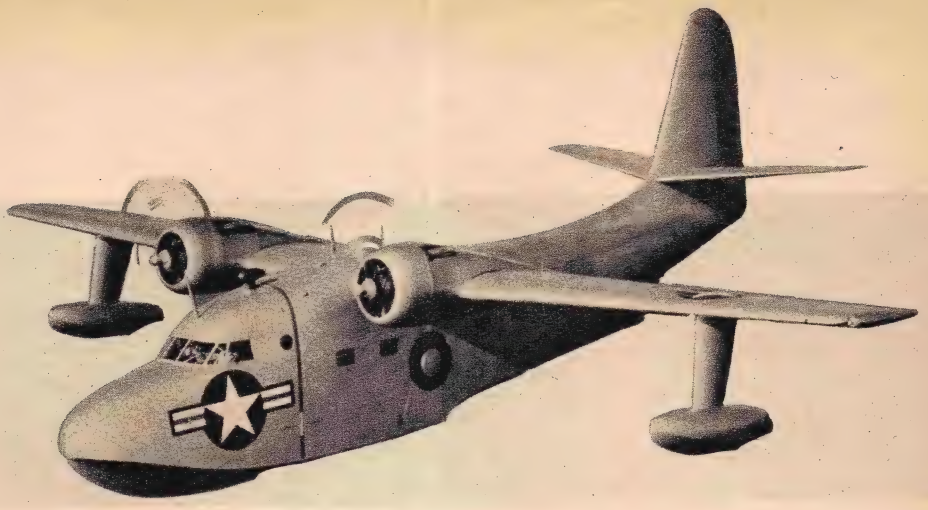

FULL SIZE
BELLCRANK IS 1/16" HARD ALUMINUM
SECTION "A-A"
.024" DIA. WIRES
LEAVE SOLID WALL TO SUPPORT MOTOR MOUNT
4
3
2
1
9" DIA., PROP "SUPER-SCRU" 9" PITCH
LINES PASS THROUGH LEFT WING (SEE TEXT).
BELLCRANK MOUNTED UNDER SPAR
A
A
2" DIA. FROOM SPINNER
1/8 X 1" COOLING AIR SLOT
1/2" SQUARES
FUEL TANK
1/16 X 1/2 X 6" ALUMINUM SKID
6-32 R.H.
4-40 ROUND HEAD


FULL SIZE NO. 1 WING RIB OUTLINE
FRONT YOKE
4-40 TAP
6-32 TAP
CURVE TO FAIR INTO SPINNER
NOTCH TO CLEAR TIMER ARM
FULL SIZE MOTOR MOUNT
6-32 TAP
THESE DIMENSIONS APPLY TO DOOLING "61" ENGINE.
2"
1-5/8"
2 1/4"
7/8"
COUNTERBORE FOR 4-40 ALLEN SCREW (2 HOLES)
TAP 6-32 (4 HOLES)
LINE HOLES IN LEFT WING RIBS ONLY
2
3
4
.040" DIA. PUSH ROD
TAIL SURFACES ARE CUT FROM 3/32" MAHOGANY PLYWOOD.
PLAN VIEWS ARE ONE-HALF ACTUAL SIZE.
WING SPAR TAPERS FROM 3/8" SQ. AT RIB NO. 1 TO 1/8X3/8" AT WING TIP.
SPARK COIL - MODELECTRIC (2 35 OZ.)
1/2" SQUARES
PLANS BY PAUL PLECAN


H
G
F
Spar-template
D
Step
C
Step
B
Bottom
A
Top
G
E
Right nacelle
B
Dowel
D
Cut apart, bevel
C
F
H
E
A
Spar-template slot
Loop housing
Wheel well
D
C
B
A
Spar-template

SOLID STUFF:

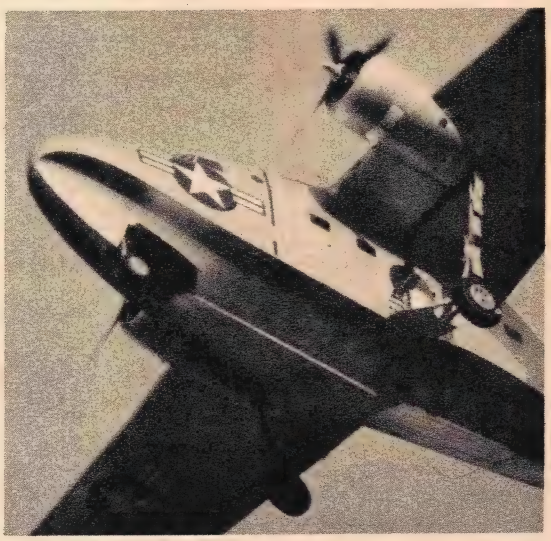
GRUMMAN ALBATROSS XJR2F

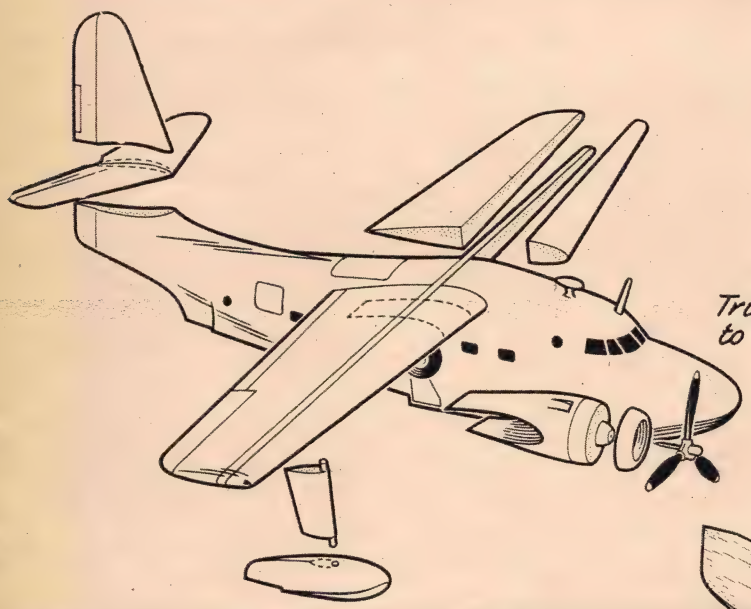


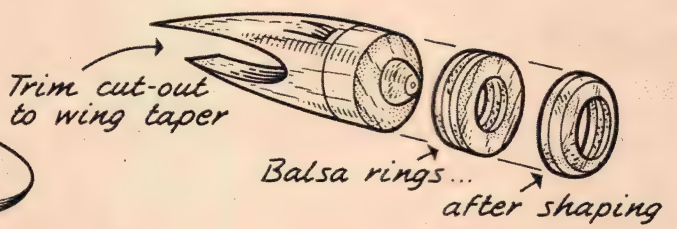
BY H. A. THOMAS

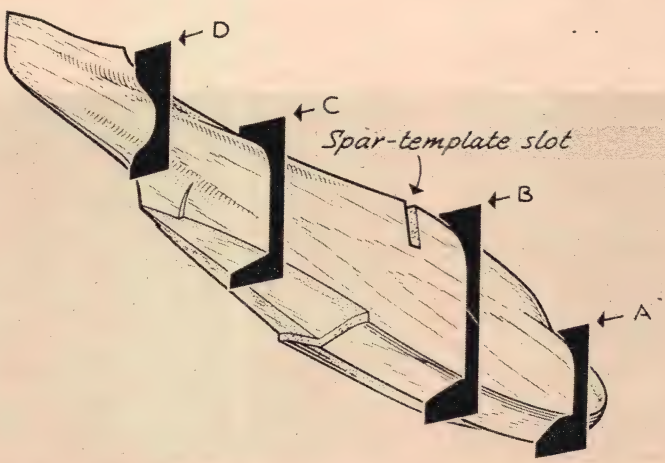
A RESCUE PLANE FOR THE NAVY AND COAST GUARD: A SCALE MODEL THAT IS DIFFERENT AND APPEALING

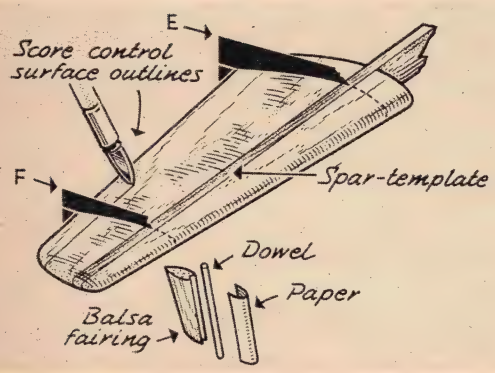
FROM a first look at the Grumman XJR2F you might think it is the "Mallard" executive transport amphibian in Navy colors. Actually it is an entirely different airplane, although it retains a strong family resemblance to the Mallard and its predecessors, the popular Widgeon and the Goose. (*Turn to page 72*)











DESIGNING UNDER THE NEW RULES

NU-LOOKER FOR THE NEW RULES

BY FRANK EHLING

IT is hard to please everyone, and the new rules will be no exception. However, we will all be flying under them, so let's see what we must have, to be in the best position when our joy and pride takes to the air.

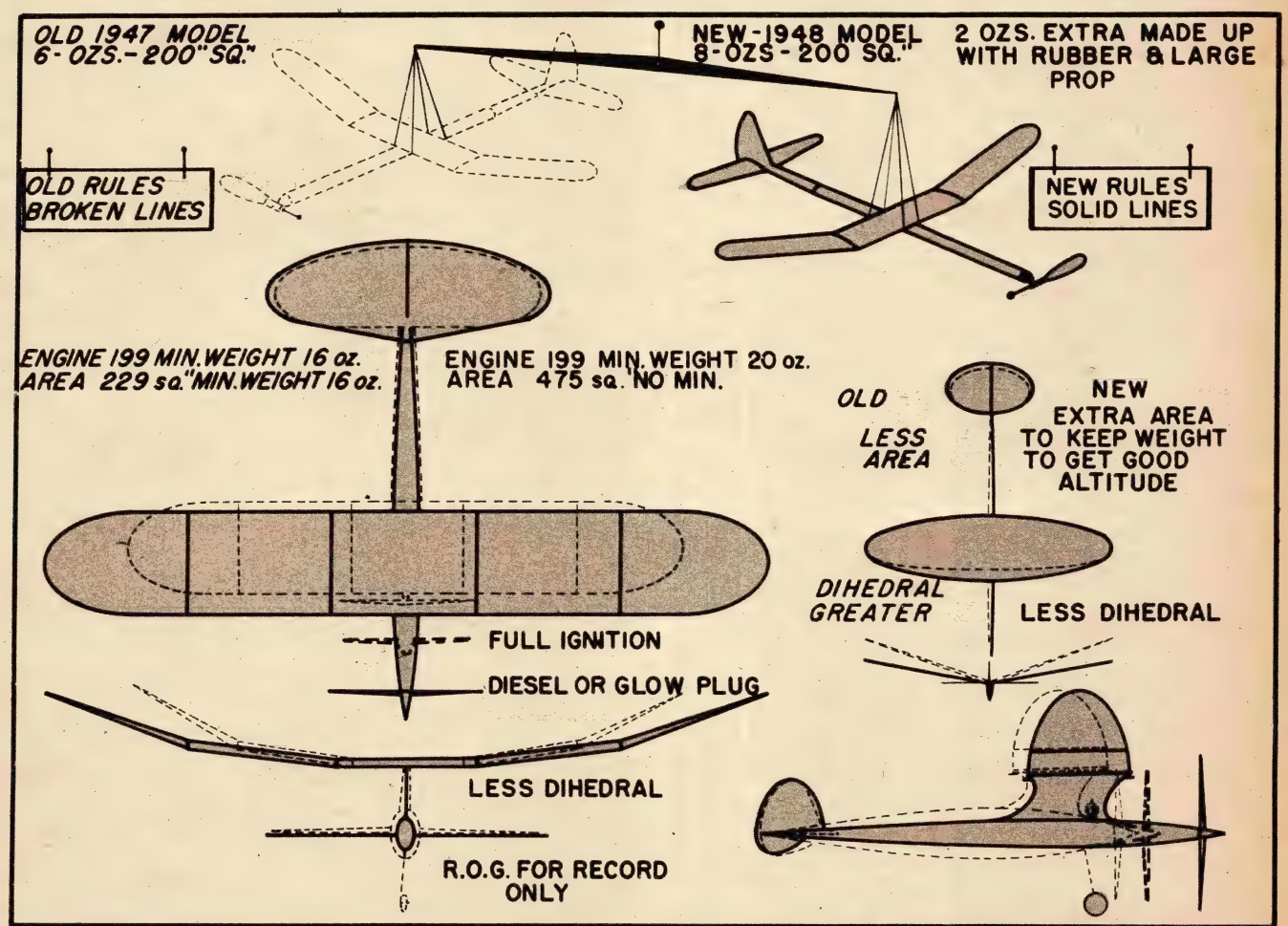
Contest directors can compete in their own Class AA meets or smaller if other contest directors are available to take over. Team entries must compete in the age group of the oldest team member. Proxy flying is okay if the contest director believes the builder is physically disabled. Only one model can be entered per event (all types and categories). Flying wings (rubber and gliders) are classified according to two-thirds projected supporting surface area.

Old timers will remember Carl Goldberg's Valkyrie (did you ever see a dream gliding?). This ship had ten square feet of wing (*Turn to page* 88)

The author is one of the best known Eastern model designers, noted for his experiments with unconventional models in the gas engine and rubber powered fields. Here Mr. Ehling outlines the practical approach to the '48 rules.

WITH no wing loading, no cross section, and only power loading, this ship was developed to show what the new rules require. This Class B ship, powered with an Air-O-Diesel, weighs 27 ounces with a wing area of 600 square inches, so you can see why it should have an excellent glide. The long nose was a "must" since the weight of the ignition was omitted. With full ignition components the nose can be cut down fifty percent as long as the ship balances as shown.

Start with the bulkheads. These are cut from 1/8" flat sheet balsa. Cut the crutch and cement in the bulkheads starting from the rear. Cut out the pylon and cement the two sides together with grain at 45 degree opposite angles. Let this dry well, otherwise it will warp and will make flying difficult. When dry, cement the pylon in place along (*Turn to page* 97)

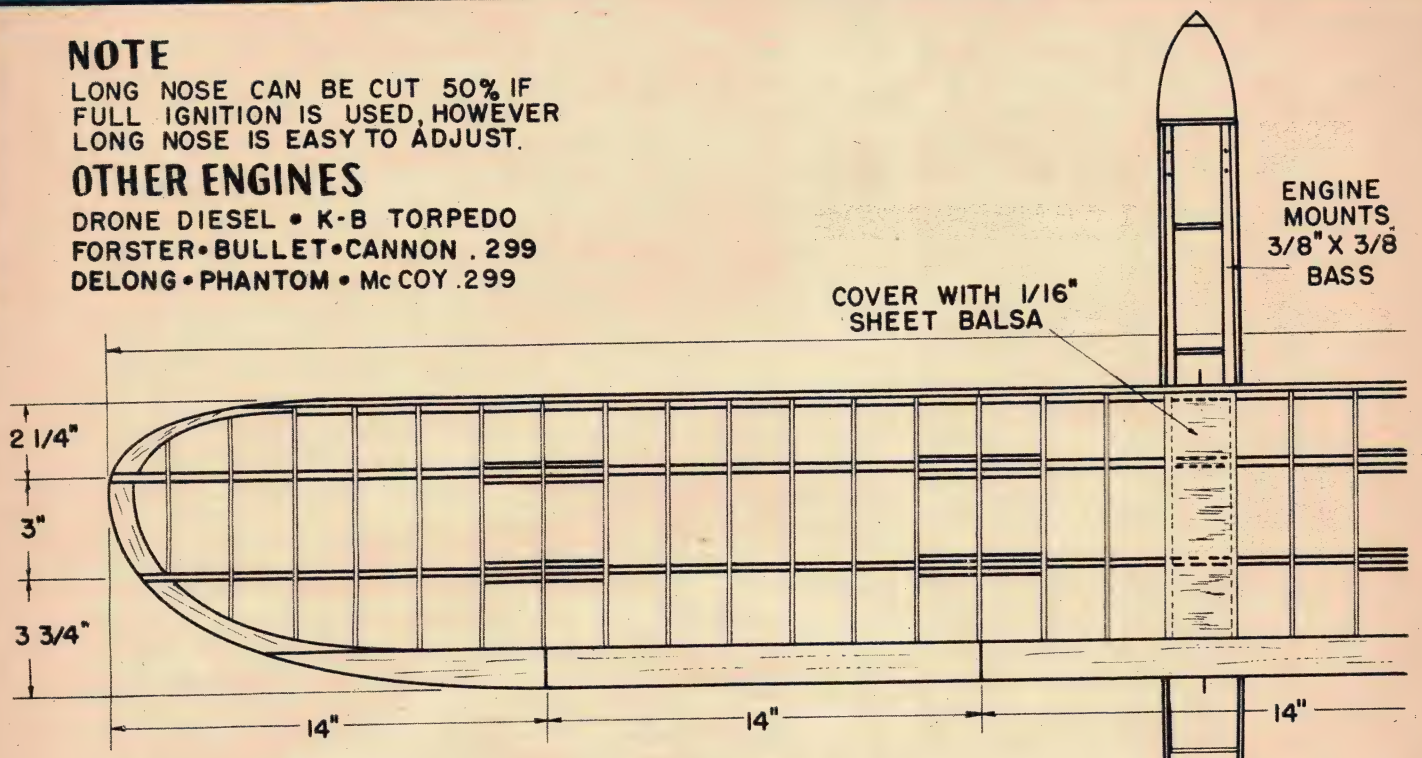


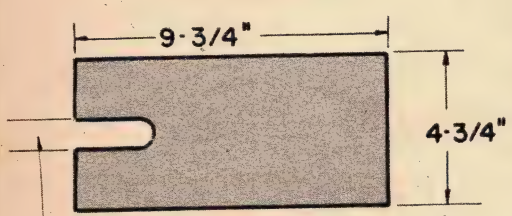
NOTE

LONG NOSE CAN BE CUT 50% IF FULL IGNITION IS USED, HOWEVER LONG NOSE IS EASY TO ADJUST.

OTHER ENGINES

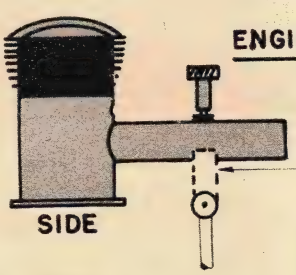
DRONE DIESEL • K-B TORPEDO
FORSTER • BULLET • CANNON .299
DELONG • PHANTOM • Mc COY .299

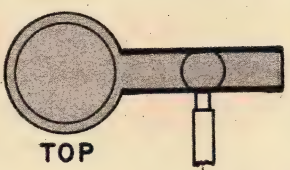




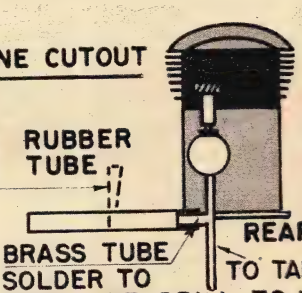
ALUM. COWL LAYOUT

TO SUIT ENGINE USED





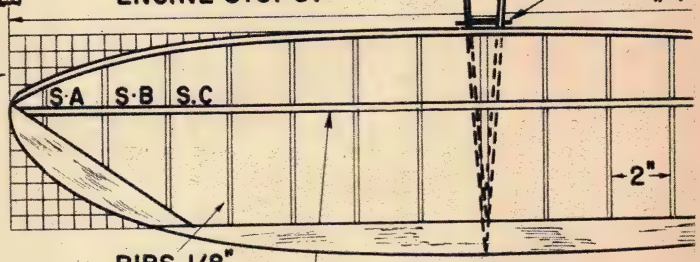
ENGINE CUTOUT



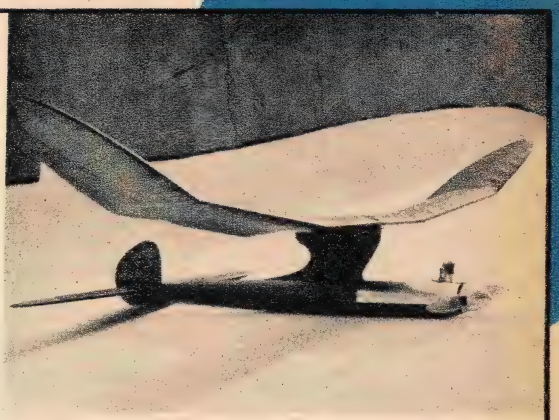
1/4" X 3/8"

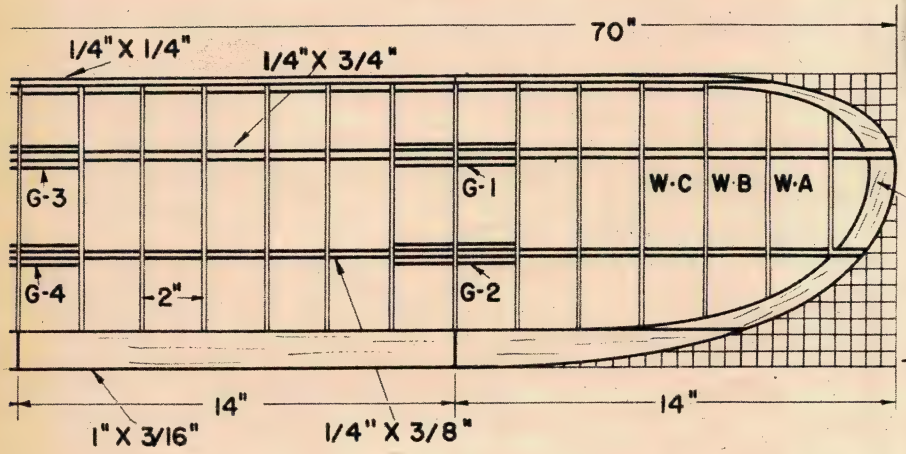
1/8" X STRINGERS

DOWEL 1/4"



HARD BALSA USED, COVERED WITH SILKSPAN.
SHIP WITHOUT ENGINE 20 OZS.



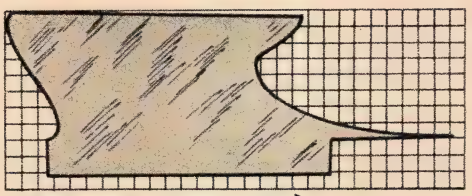


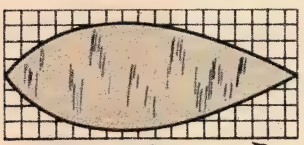
BULKHEADS
1/8" SHEET

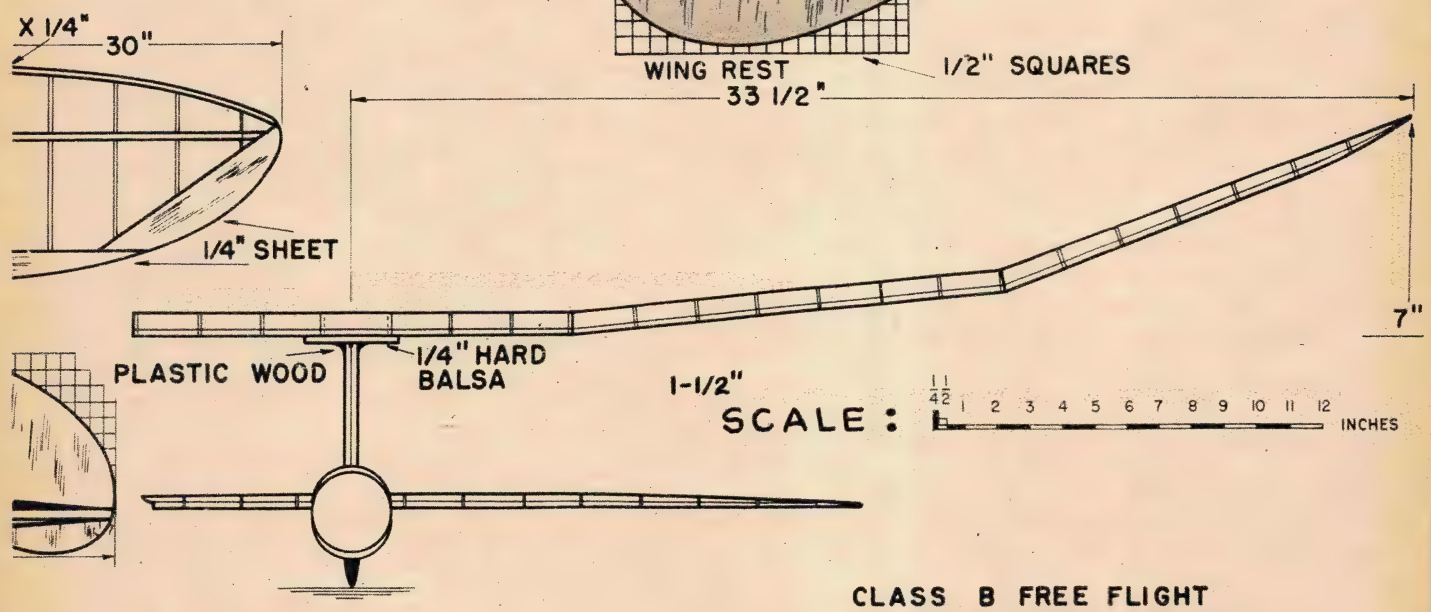
1/4"
NOT SHOWN

PYLON NOTES

USE VERY HARD BALSA, CEMENT WELL. PLASTIC WOOD FOR FILLET. COVER WITH SILK







CLASS B FREE FLIGHT
BY FRANK V. B. EHLING

MODEL MATTERS

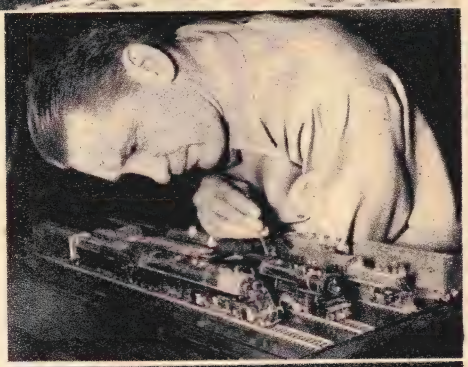
INCLUDING CLUB CHATTER AND OUT WEST

BY THE CLUBMAN

- FREE FLIGHT GAS PROVES NATIONAL'S BEST EVENT
- WICHITA PLAN SHOULD WORK THROUGHOUT LAND
- DE BOLT OPPOSES ALL CANADA IN TORONTO FRAY

UNDER the heading of highly interesting statistics are some extraordinary facts and figures on the last Nationals, just forwarded to us by Frank Nekimken. On a basis of entrants who actually flew in each event, indoor proved more popular than control-line speed and stunt put together. Some 12½ percent of the total entrants who flew did so in indoor, whereas only 10½ percent contributed to control-line. Outdoor rubber came to about 21 percent and free flight gas, the most popular event, piled up a husky 47⅓ percent. For mental arithmetic sharpies who will note that these figures don't add up, the missing percentages were split among towline, radio-control, and scale. Contestants who flew in these various events totaled as follows: indoor, 149; outdoor, 246; control-line, 125; free flight, 572.

(*Turn to page* 118)



● (Top) Bob Denny launches his Buzzard Bombshell at annual Douglas Trophy contest near Salt Lake City, Utah. (Center-top) Ground him! United Air Lines' Capt. R. J. "Mike" Gibbons has 500,000 air hours but fools around with trains. (Center-bottom) Bill Tyler flies indoor job at Lakehurst, N. J. (Bottom-left) Goshen, N. Y., Central School club. (Bottom-right) Oakland, Calif., Cloud Dusters.

INSIDE STUFF:

MICRO DIESEL

HERE is a new diesel for us to inspect. Manufactured in Detroit—the motor city—Micro makes its bow into the model engine field.

Although some early compression ignition engines were somewhat ornery and cantankerous the Micro ran as smoothly as could be desired. With a bore of .500 and a stroke of .775, total displacement comes up to 0.13. That, of course, makes it a Class A engine.

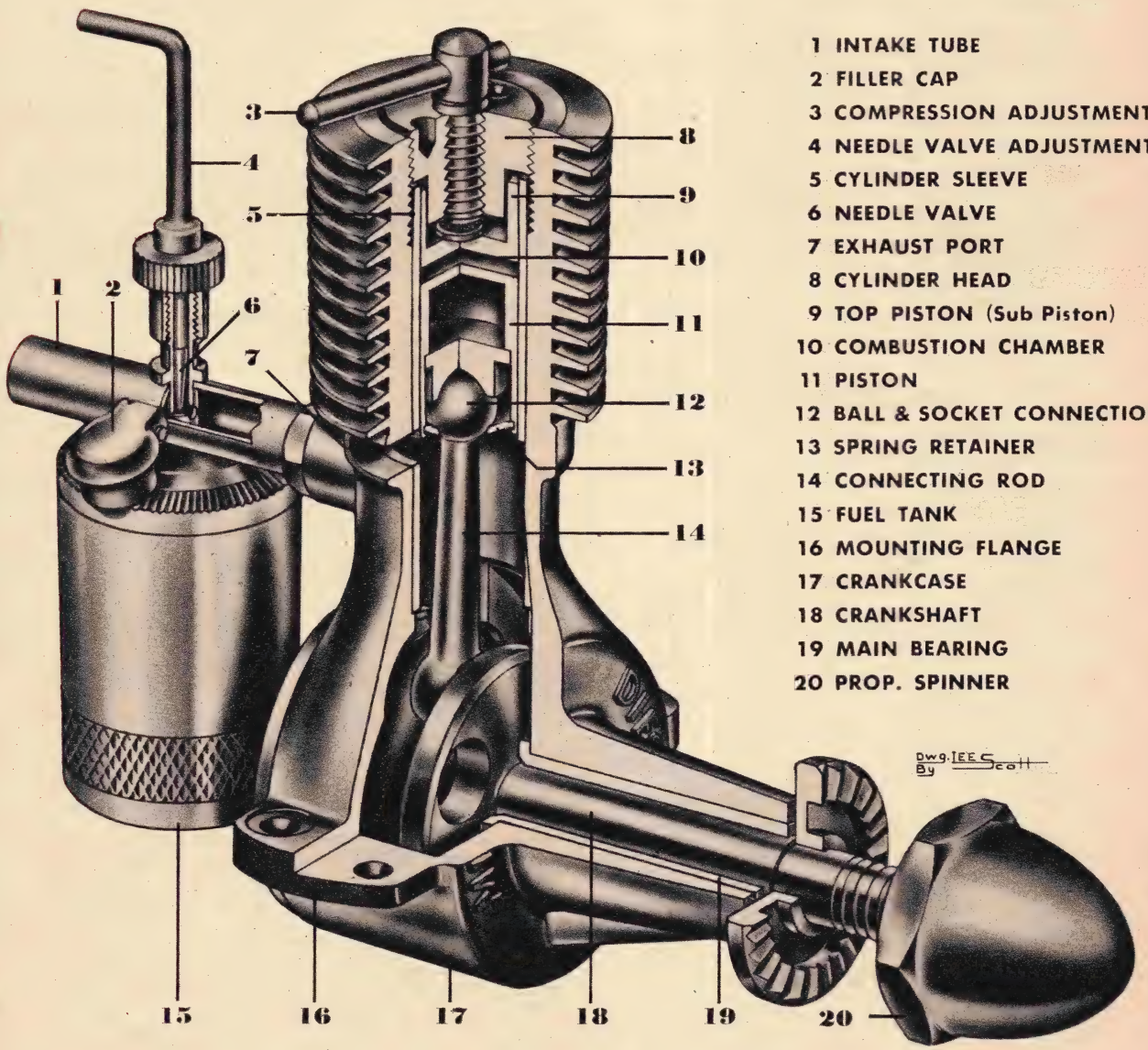
One feature of the Micro is its adjustable compression. This is not revolutionary, but it is an excellent idea.

Crankcase, cylinder barrel and fins are all cast in one piece of aluminum alloy. The 12 fins are machined smoothly and tapered to insure rapid heat dissipation.

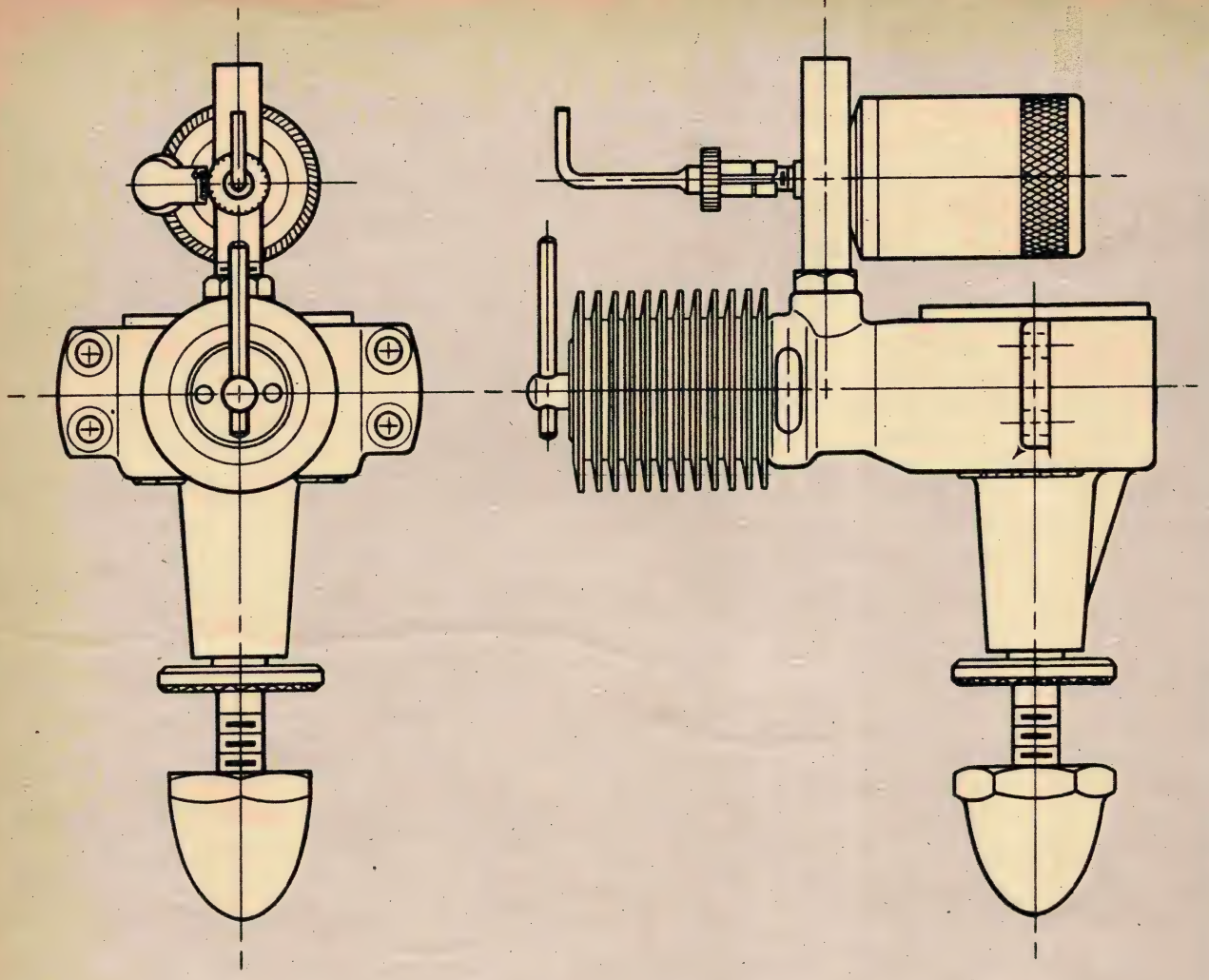
The cylinder sleeve is steel and fits snugly into the barrel. The milled-in ports consist of two exhaust ports, one intake port and a transfer slot which is actually a by-pass. The sleeve is "H"-shape in cross section. The horizontal plug section completes the top of the firing (combustion) chamber.

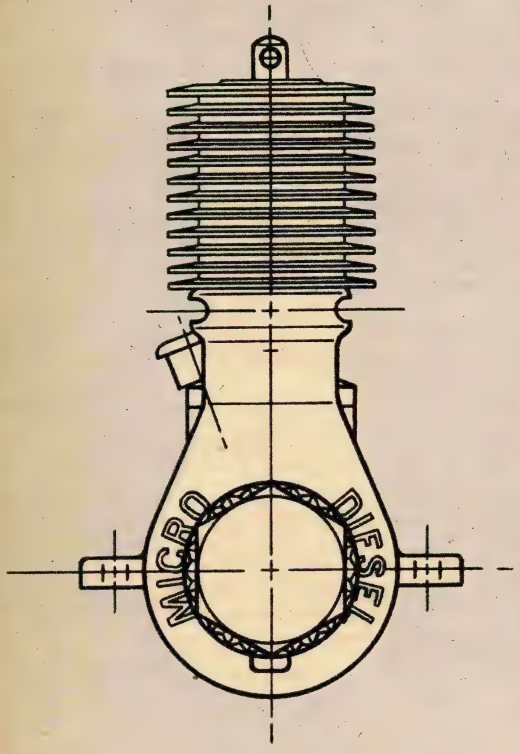
The sleeve is held in place by the head, but instead of a permanent arrangement, an adjusting screw is fitted through the head and rests upon the top portion of the horizontal "plug."

To increase the compression one turns down on the adjustment screw. This pushes down slightly on the sleeve. When you decrease the com- (*Turn to page* 95)



1 INTAKE TUBE
2 FILLER CAP
3 COMPRESSION ADJUSTMENT
4 NEEDLE VALVE ADJUSTMENT
5 CYLINDER SLEEVE
6 NEEDLE VALVE
7 EXHAUST PORT
8 CYLINDER HEAD
9 TOP PISTON (Sub Piston)
10 COMBUSTION CHAMBER
11 PISTON
12 BALL & SOCKET CONNECTION
13 SPRING RETAINER
14 CONNECTING ROD
15 FUEL TANK
16 MOUNTING FLANGE
17 CRANKCASE
18 CRANKSHAFT
19 MAIN BEARING
20 PROP. SPINNER





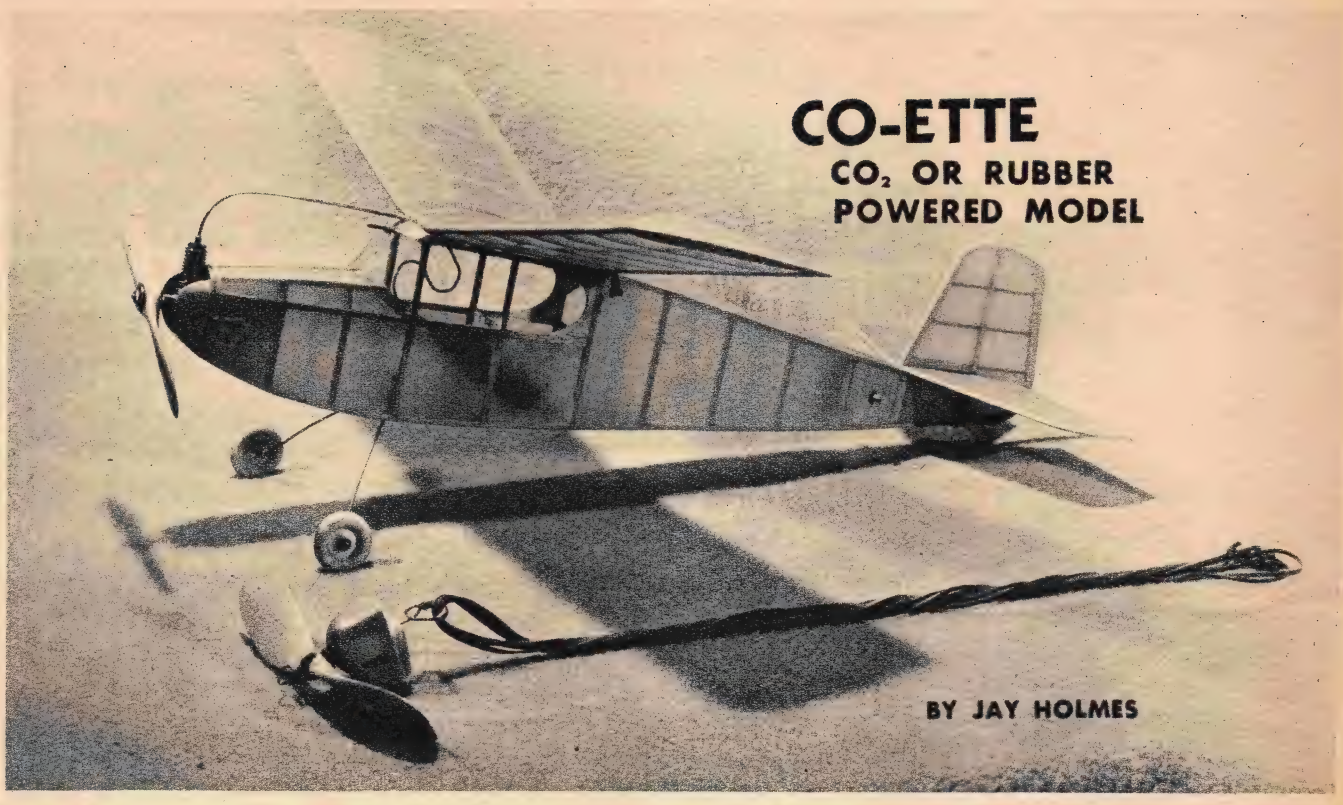
MICRO DIESEL

Bore .500 in.
Stroke .775 in.
Displacement .13 cu. in.

CLASS A UNDER AMA FREE FLIGHT AND CONTROL LINE GAS RULES

These are full size drawings of the Micro Diesel. Use them to position the engine in your model.

LEE Scott



CO-ETTE

CO_2 OR RUBBER POWERED MODEL

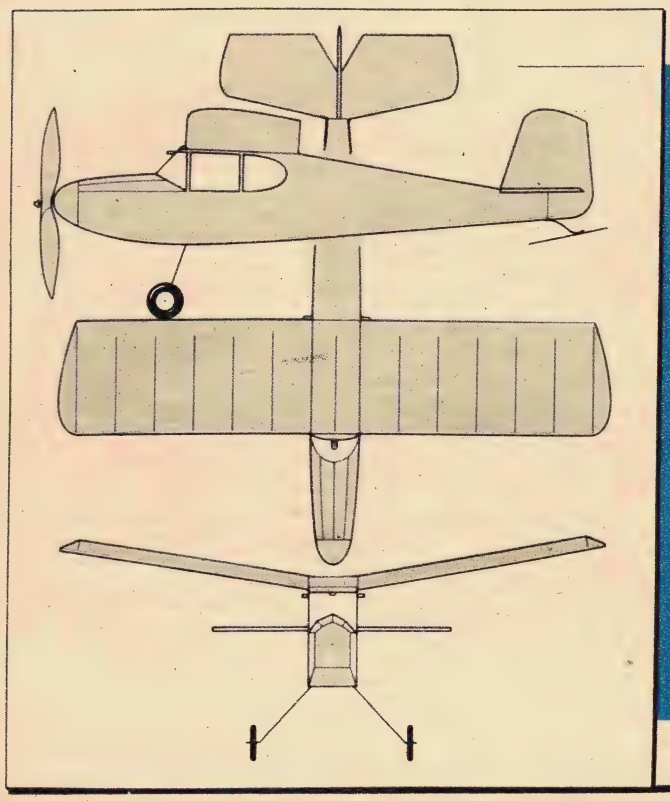
BY JAY HOLMES

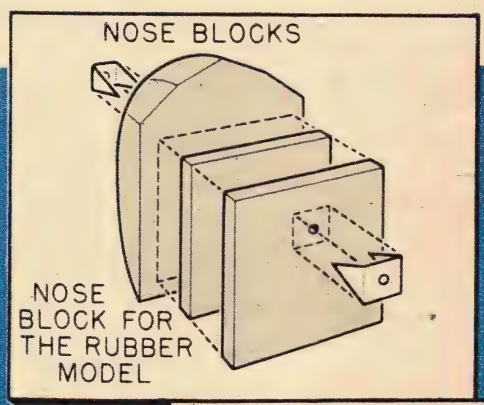
POWERED BY HERKIMER OR U.S. RUBBER COMPANY'S T-56, THIS GOOD LOOKING FLYER IS A "NATURAL"

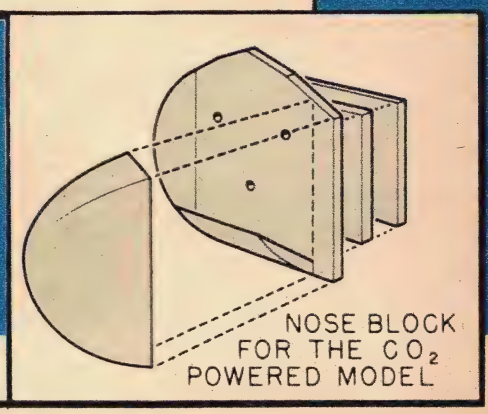
TO see if there was any notable difference in CO_2 powered models this ship was built for both rubber and CO_2 power. The results showed that although the CO_2 version with Herkimer's carbon dioxide engine is slightly heavier it has good performance and the duration (in glide) is comparable to the rubber job flown on U.S. Rubber Company's T-56.

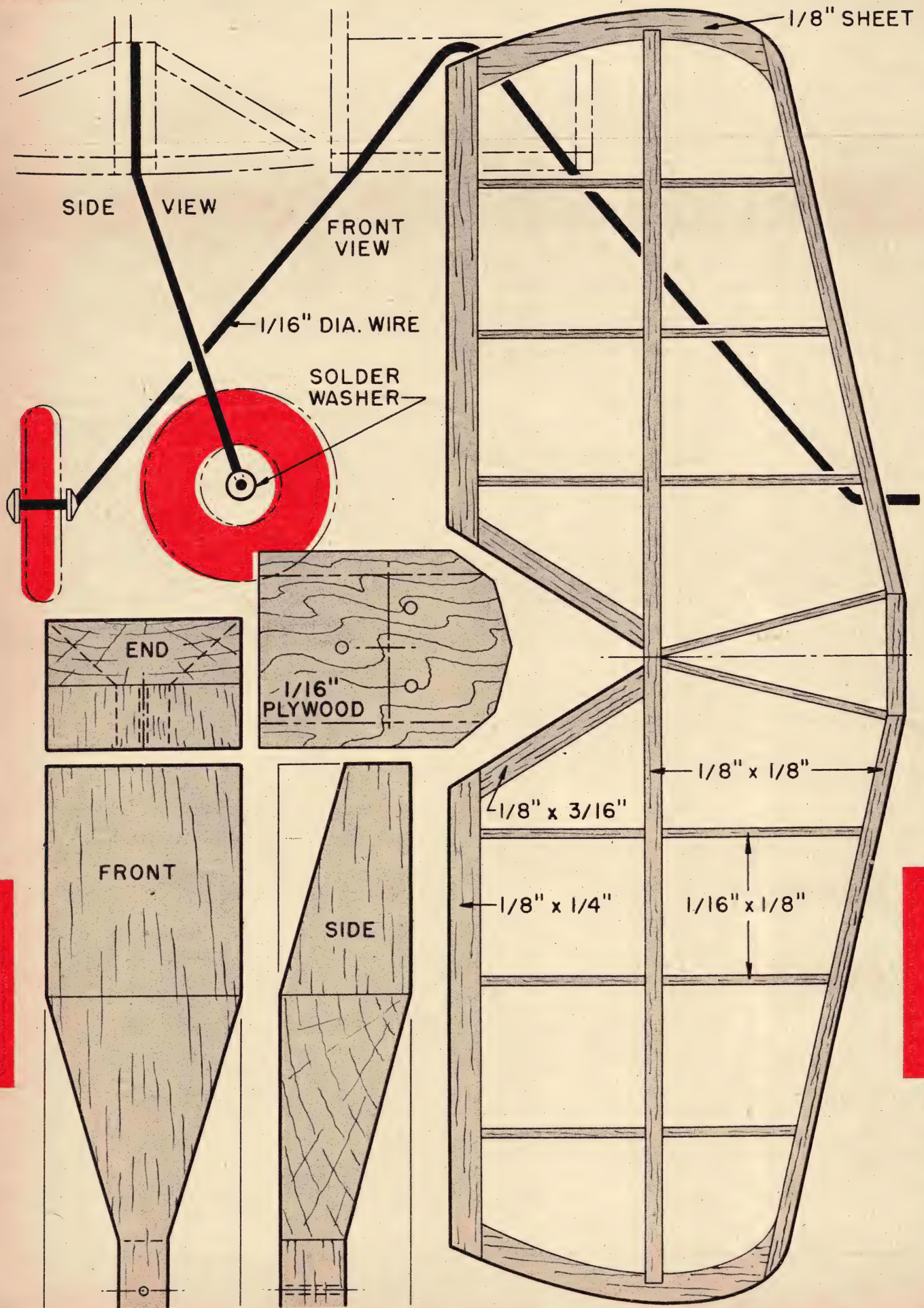
This little ship is suitable for beginners and experts alike, as it is simple but efficient.

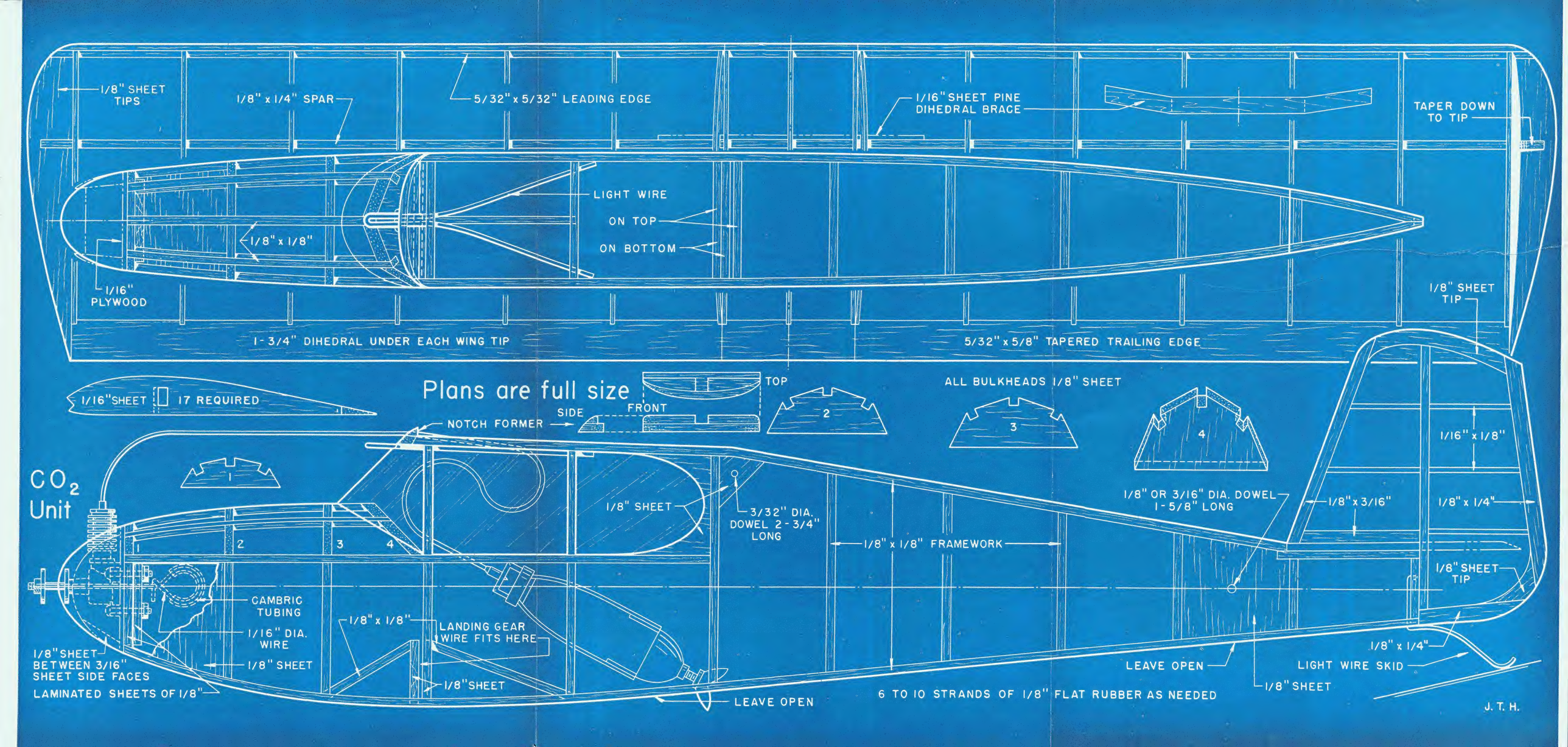
As the plans are full size there will be none of the usual troubles in enlarging. Pin punch all formers, bulkheads, and outlines on sheet balsa (*Turn to page* 73)



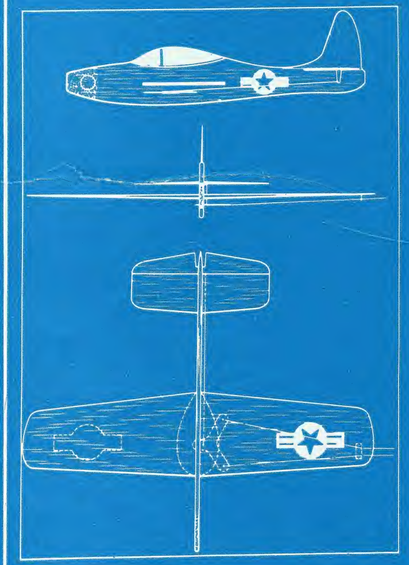


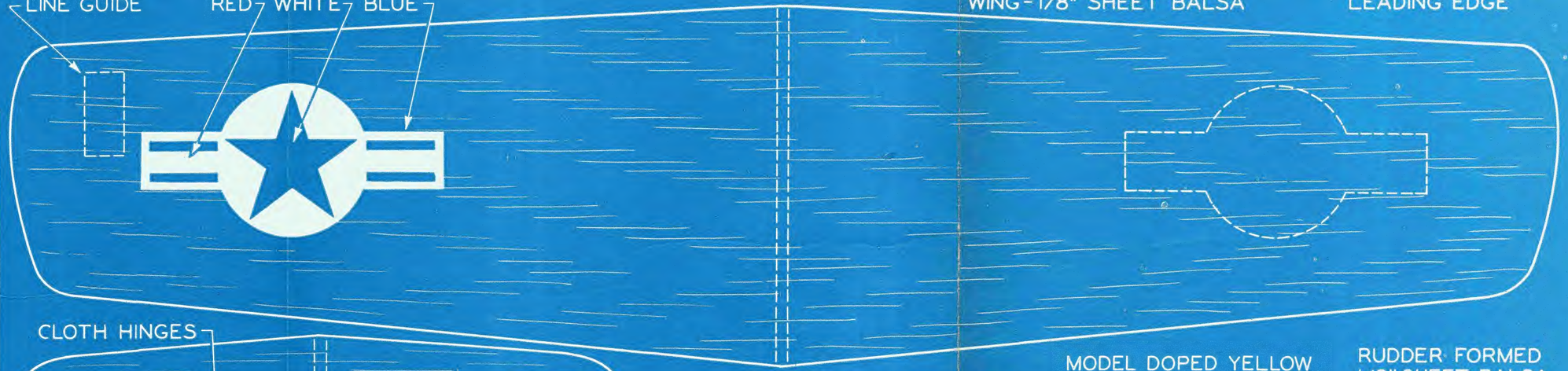


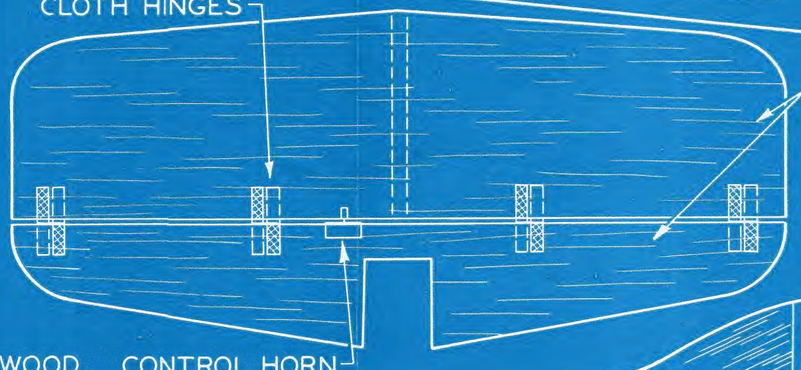

1/8" SHEET
SIDE VIEW
FRONT VIEW
1/16" DIA. WIRE
SOLDER WASHER
END
1/16" PLYWOOD
FRONT
SIDE
1/8" x 1/8"
1/8" x 3/16"
1/8" x 1/4"
1/16" x 1/8"

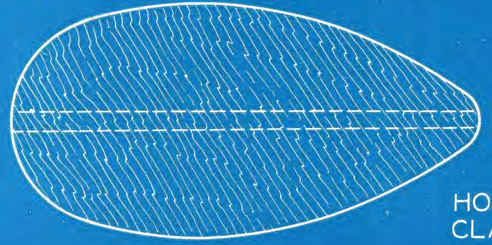

1/8" SHEET TIPS
1/8" x 1/4" SPAR
5/32" x 5/32" LEADING EDGE
1/16" SHEET PINE DIHEDRAL BRACE
TAPER DOWN TO TIP
LIGHT WIRE
ON TOP
ON BOTTOM
1/8" x 1/8"
1/16" PLYWOOD
1/8" SHEET TIP
1-3/4" DIHEDRAL UNDER EACH WING TIP
5/32" x 5/8" TAPERED TRAILING EDGE
Plans are full size
1/16" SHEET
17 REQUIRED
NOTCH FORMER
SIDE
FRONT
TOP
ALL BULKHEADS 1/8" SHEET
1
2
3
4
CO_2 Unit
1/8" SHEET
3/32" DIA. DOWEL 2-3/4" LONG
1/8" x 1/8" FRAMEWORK
1/8" OR 3/16" DIA. DOWEL 1-5/8" LONG
1/8" x 3/16"
1/16" x 1/8"
1/8" x 1/4"
1/8" SHEET TIP
CAMBRIC TUBING
1/16" DIA. WIRE
1/8" x 1/8"
LANDING GEAR WIRE FITS HERE
1/8" SHEET BETWEEN 3/16" SHEET SIDE FACES
1/8" SHEET
LAMINATED SHEETS OF 1/8"
1/8" SHEET
LEAVE OPEN
LEAVE OPEN
1/8" SHEET
1/8" x 1/4"
LIGHT WIRE SKID
6 TO 10 STRANDS OF 1/8" FLAT RUBBER AS NEEDED
J. T. H.

WHIP-POWER P-84

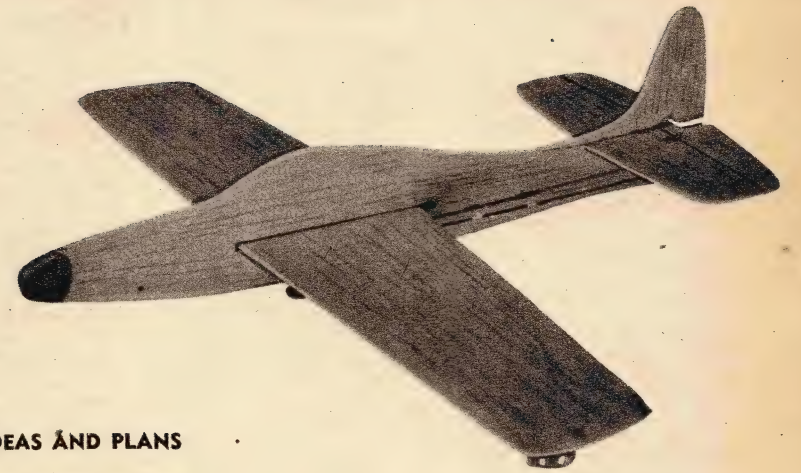








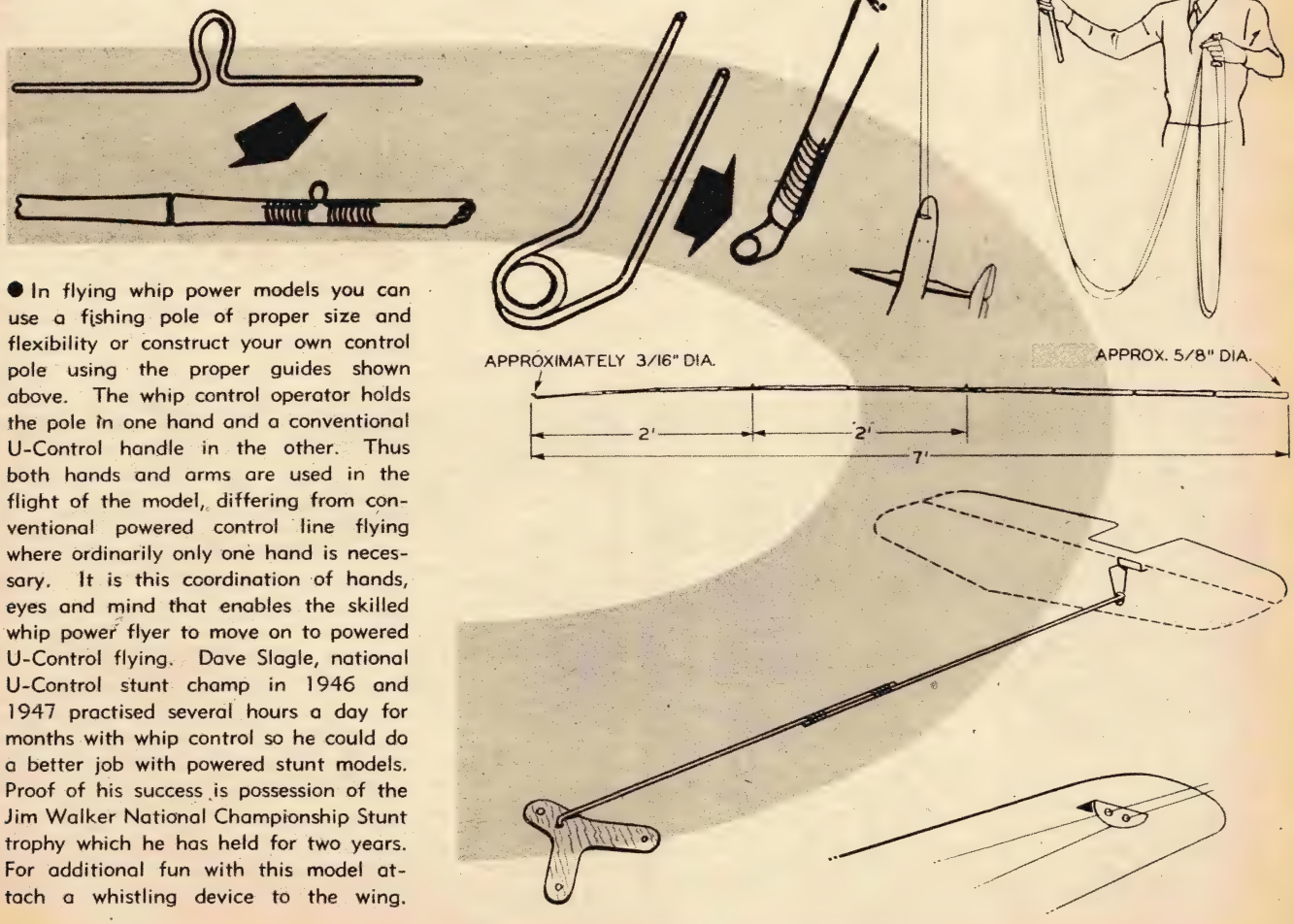
WHIP POWER THUNDERJET



BY JIM WALKER
IN COLLABORATION WITH BILL TYLER

THE "FATHER OF U-CONTROL" GIVES YOU HIS IDEAS AND PLANS FOR BUILDING AND FLYING A FAST WHIP CONTROL MODEL PLANE

WHIP Control models can perform any maneuver that you can get out of those souped-up high powered gas jobs. You don't need a motor to be a "hot-rock" pilot! You can fly a Whip Control model through every stunt in the books, and when it comes to speed even the "hottest" gas jobs have difficulty catching them. What's the answer? Simply this. First of all, they have a lot less drag (less air resistance) than gas models, and secondly, by using a long pole you can "whip" 'em around at sensational speeds. Naturally, you have to be an experienced pilot to get that kind of performance. But there's one thing for sure—if you can fly a Whip Control model, you'll find flying the powered jobs a cinch. And there's many an expert control- (*Turn to page* 109)



● In flying whip power models you can use a fishing pole of proper size and flexibility or construct your own control pole using the proper guides shown above. The whip control operator holds the pole in one hand and a conventional U-Control handle in the other. Thus both hands and arms are used in the flight of the model, differing from conventional powered control line flying where ordinarily only one hand is necessary. It is this coordination of hands, eyes and mind that enables the skilled whip power flyer to move on to powered U-Control flying. Dave Slagle, national U-Control stunt champ in 1946 and 1947 practised several hours a day for months with whip control so he could do a better job with powered stunt models. Proof of his success is possession of the Jim Walker National Championship Stunt trophy which he has held for two years. For additional fun with this model attach a whistling device to the wing.

WACO U.M.F.

SCALE CONTROL MODEL

BY WALTER L. SCHRODER

ALL YOU OHLSSON "60" FANS CAN STAND UP AND CHEER—HERE IS THE MODEL FOR YOUR ENGINE

THIS Waco, product of the early thirties, was the plane in which many of the present day airline pilots and executives of the aeronautical industry trained. Developed primarily for the fledgling Army and Navy Air Forces, it was also quite popular as a private trainer on the many small fields which mushroomed throughout the country. Its capacious front seat with room for two also made it ideal for those $1.00 sight-seeing hops so popular in those days.

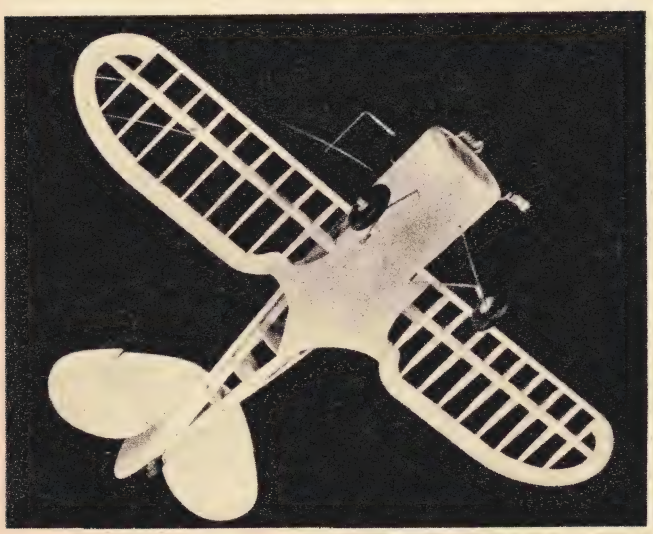
This bi-plane represents the days when every plane had more glamour in its right wing strut then the present stripped-down, aerodynamically perfect jobs that you hear but can't see as they streak by.

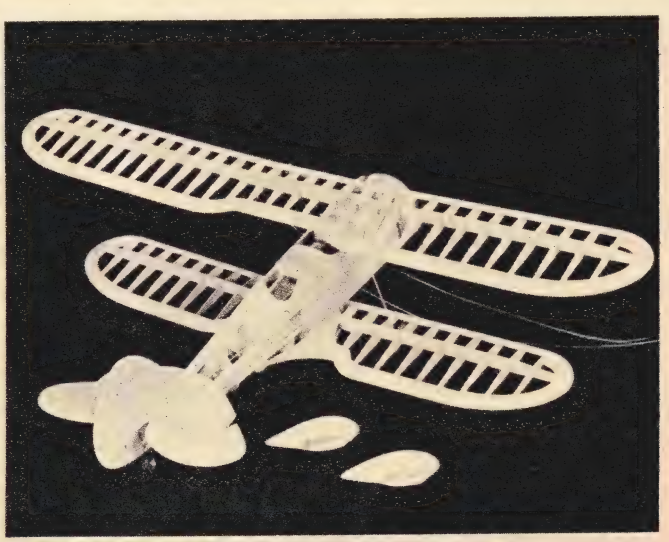
Of course many of the younger set will say that old-timers glory in living in the past and resist progress. If any of the modern set ever attended a county fair or small airport and experienced the thrill of watching a parachutist or stunt man climb out between the wings and make his way back and forth between the struts and guy wires while performing dare-devil stunts, he or she would soon admit that today's scientific exploits couldn't hold a candle to the by-the-seat-of-the-pants flying era.

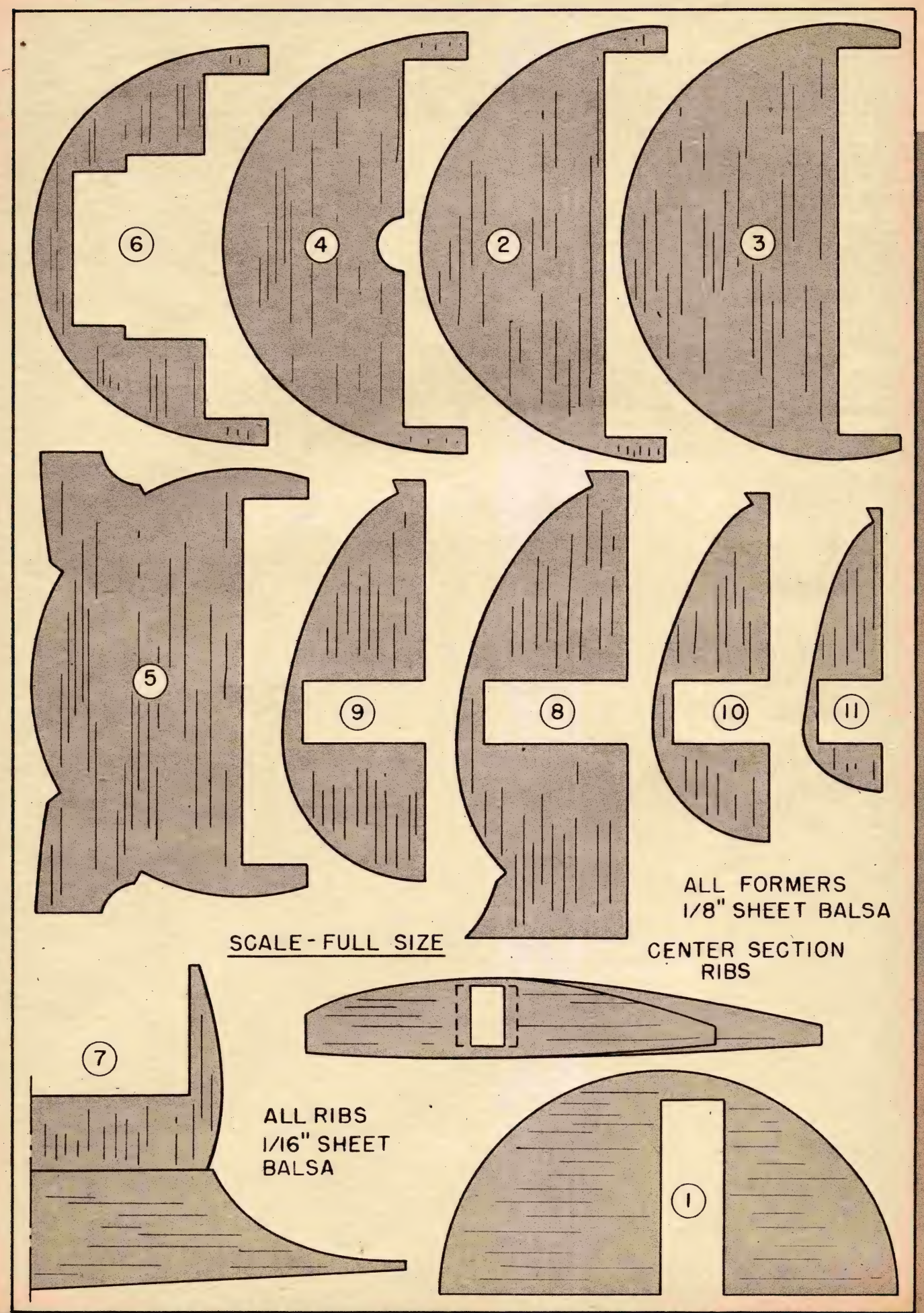
The UMF's proportions are ideal for scale and stunt work, and require no alterations from scale. Any builder who has been attending control-line contests and has watched the flight attempts of the average entry in a beauty scale event, will welcome the excess of power called for here. So what if the engine does protrude through the cowl. You're not cutting down on scale —it's still the same—but there is more than enough power for any condition or emergency.

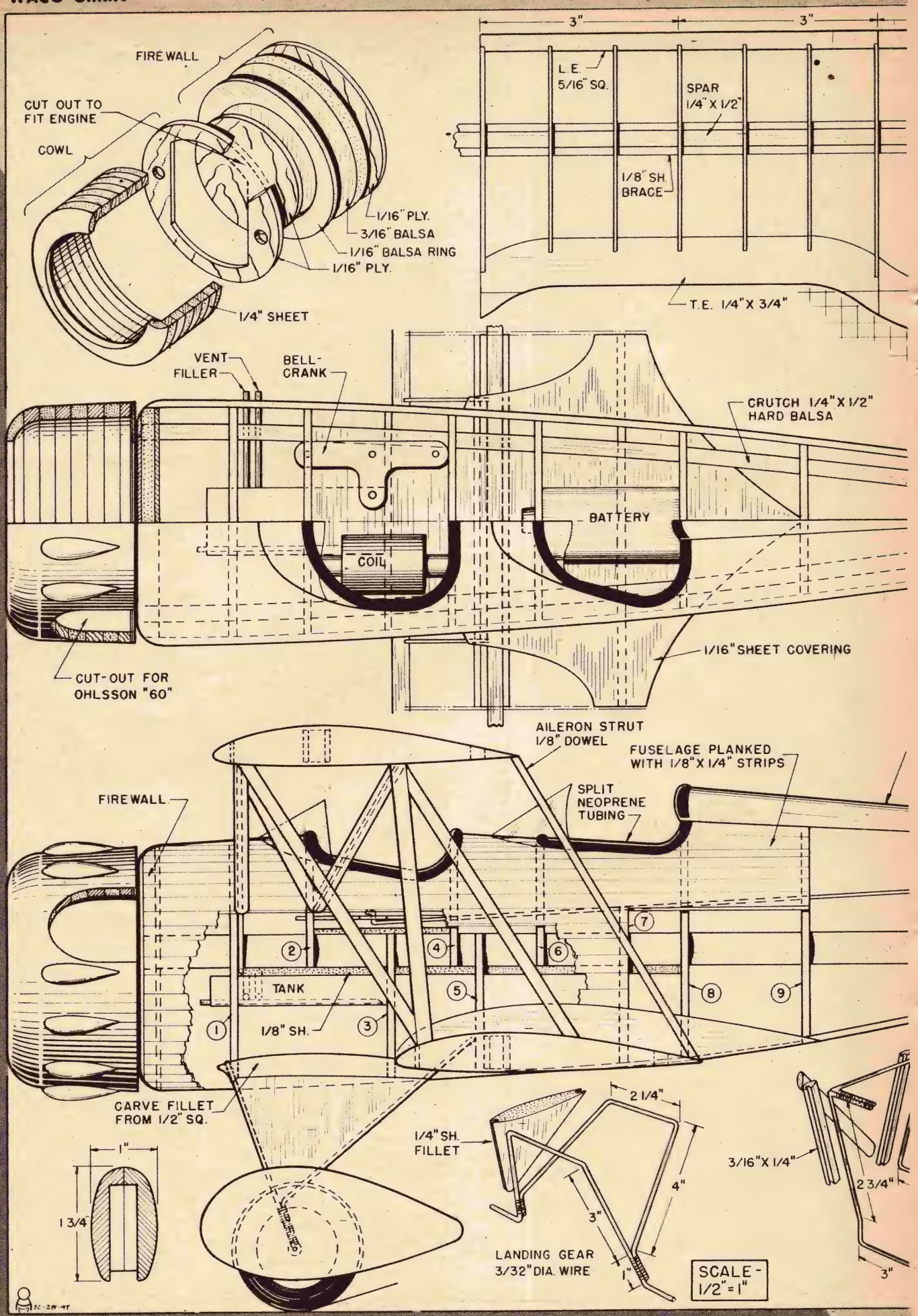
To keep appearance and facilitate choking the engine it is mounted at a 20° angle, offset from the vertical. The radial mounting advantages of the Ohlsson "60" engine have been employed. If another engine is used insert the conventional beam type motor mounts. The minimum size for such mounts should be 3/8" x 5/8" by whatever length is desired. Such mounts should extend rearward through at least one station to the rear of the firewall.

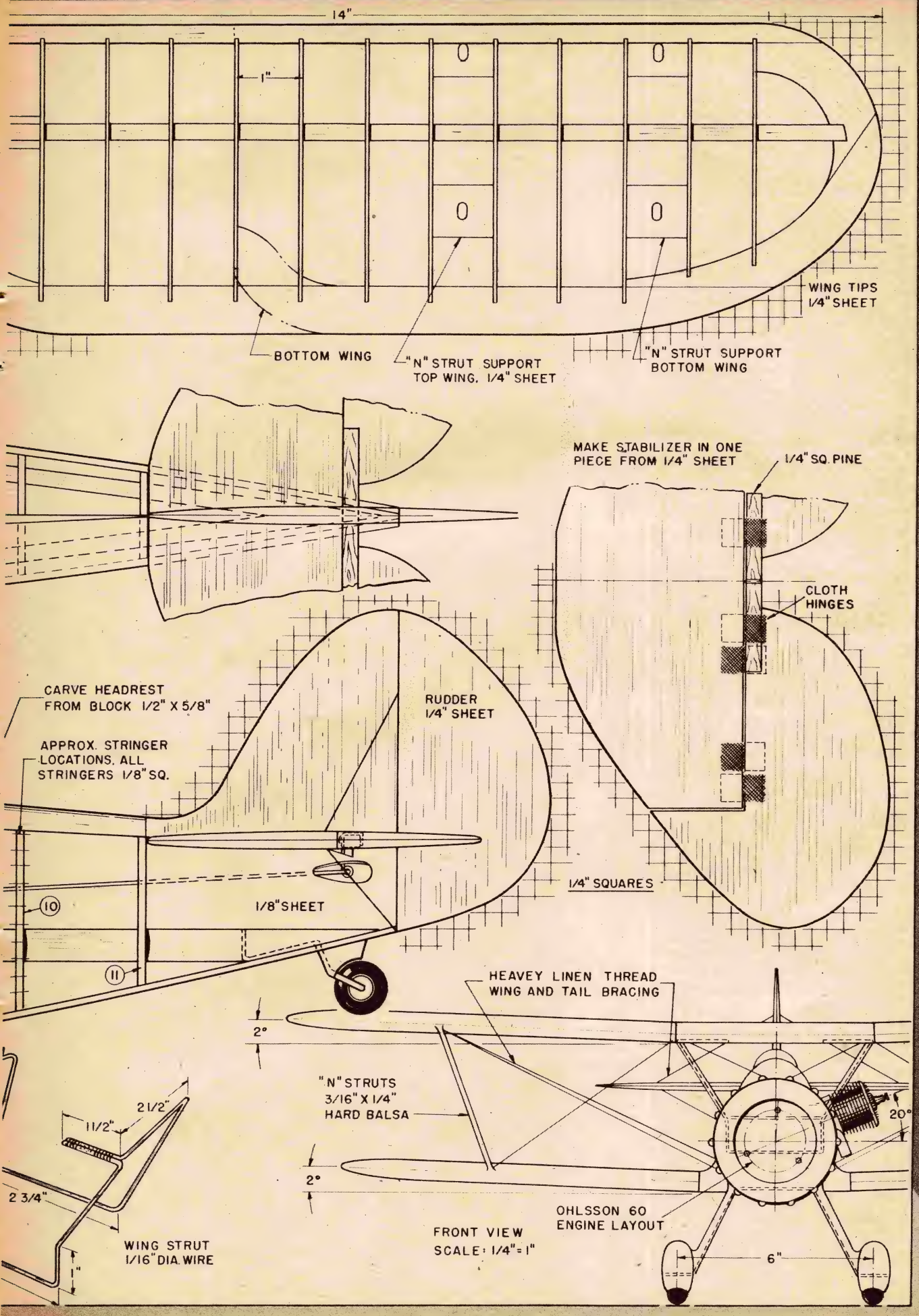
To start construction, scale up the plans as required. The fuselage requires little in the way of plans. As a matter of fact all that is required is the crutch drawing. To lay out the crutch, plot the station positions and then use the full size bulkheads to secure the widths at the respective stations. Now place the 1/4" x 1/2" longerons over the plans. If necessary soak the longerons in hot water four or five minutes; this will (*Turn to page* 91)






6
4
2
3
5
9
8
10
11
ALL FORMERS
1/8" SHEET BALSA
SCALE - FULL SIZE
CENTER SECTION
RIBS
7
ALL RIBS
1/16" SHEET
BALSA
1


FIRE WALL
CUT OUT TO FIT ENGINE
COWL
1/16" PLY.
3/16" BALSA
1/16" BALSA RING
1/16" PLY.
1/4" SHEET
3"
3"
L.E. 5/16" SQ.
SPAR 1/4" X 1/2"
1/8" SH. BRACE
T.E. 1/4" X 3/4"
VENT FILLER
BELL-CRANK
CRUTCH 1/4" X 1/2" HARD BALSA
BATTERY
COIL
1/16" SHEET COVERING
CUT-OUT FOR OHLSSON "60"
AILERON STRUT 1/8" DOWEL
FUSELAGE PLANKED WITH 1/8" X 1/4" STRIPS
FIRE WALL
SPLIT NEOPRENE TUBING
TANK
1/8" SH.
CARVE FILLET FROM 1/2" SQ.
1"
1 3/4"
1/4" SH. FILLET
2 1/4"
4"
3"
1"
LANDING GEAR 3/32" DIA. WIRE
3/16" X 1/4"
2 3/4"
3"
SCALE - 1/2" = 1"


14"
1"
WING TIPS
1/4" SHEET
BOTTOM WING
"N" STRUT SUPPORT
TOP WING, 1/4" SHEET
"N" STRUT SUPPORT
BOTTOM WING
MAKE STABILIZER IN ONE
PIECE FROM 1/4" SHEET
1/4" SQ. PINE
CLOTH
HINGES
CARVE HEADREST
FROM BLOCK 1/2" X 5/8"
APPROX. STRINGER
LOCATIONS. ALL
STRINGERS 1/8" SQ.
RUDDER
1/4" SHEET
1/4" SQUARES
1/8" SHEET
10
11
HEAVEY LINEN THREAD
WING AND TAIL BRACING
2°
"N" STRUTS
3/16" X 1/4"
HARD BALSA
20°
2°
21/2"
11/2"
2 3/4"
WING STRUT
1/16" DIA. WIRE
1"
OHLSSON 60
ENGINE LAYOUT
FRONT VIEW
SCALE: 1/4" = 1"
6"

BY VAL A. LUCE

JUST about this time of year, many of you contest hounds will have made the last caress with the dope brush on the ships with which you intend to haul home the hardware during the coming flying season. While waiting for the rains to slack off a little so that you can get out and test fly, what happens to your creations? When the sun finally does come out, do you find that all the surfaces have warped into horrible travesties because you stashed 'em away too close to a radiator? If so, take a lesson from Bob Bates of Clarksburg, W. Va. Bob was a national record-holder at the ripe age of eight. He is a veteran campaigner who still has a few years to go before he "graduates" from the Senior class to the Open division. His models are works of art, even

● Allan F. Kitchel, Jr., Old Greenwich, Conn., has scale model collection of more than 130 planes. Here are more than 45 of first World War. Mr. Kitchel built these models himself.

though he completes them in far less than average building time. Having built them right, Bob wants them to stay that way, and for this reason he not only stores them when not in use away from places where they might be subjected to heat treatment, but also holds wing and tail surfaces true with sand bags. It may sound a little too picayunish to some of us who are a little more easy-going, but some week when you've nothing else to do pay Clarksburg a visit and have Bob spend the week showing you the trophies he's won!

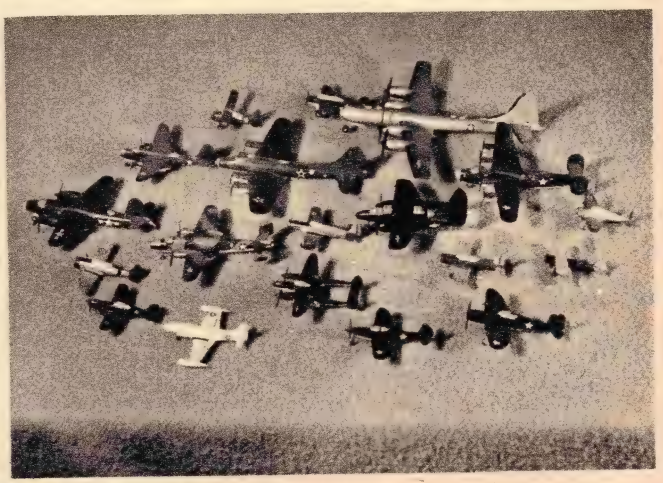
And what of the power you use? If rubber, is the skein slung over a valve handle next to a nice hot furnace, so that the rubber will get good and brittle, or is it powdered well after careful cleaning and stored in a lightproof container in a cool place? Heat and light rob contest rubber of its "life." Dirt, no matter how fine, can saw through the strands beau- (*Turn to page* 113

REPORT FROM WASHINGTON

BY
RUSSELL W. NICHOLS
EXECUTIVE DIRECTOR ACADEMY OF MODEL AERONAUTICS

AS a result of the recent election, AMA members have chosen a new slate of officers to serve during the coming year.

New President of the AMA is C. O. Wright of Topeka, Kansas. Known to model builders everywhere as "C.O.," Mr. Wright has spent a large portion of his time aiding the cause of model aviation. When he is not working with modelers or models, "C.O." serves as Executive Secretary of the Kansas State Teachers' Association with headquarters in Topeka. Thus, he will bring



● Here are a few of the 85 World War II scale models collected by Mr. Kitchel. Array is now driving him out of house and home and he is looking for a prospective purchaser. Any bids?

to the Academy during his term of office the benefit of an extensive background in organizational work. The Academy of Model Aeronautics is extremely fortunate to be headed by a man of "C.O.'s" qualifications and character.

The new District Vice-Presidents are as follows: District I—David Hunt, West Hartford, Conn.; District II—John Schneider, Scotia, New York; District III—John W. (Red) Hillegas, Cleveland, Ohio; District IV—Frank Parmenter, Hampton, Virginia; District V—H. R. Hudson, Atlanta, Georgia; District VI—Frank Nekimken, Indianapolis, Indiana; District VII—R. F. Watson, Des Moines, Iowa; District VIII—Rogers Barton, College Station, Texas; District IX—Leo Rutledge, Wichita, Kansas; District X—Ray Acord, Los Angeles, California; District XI—Jim Walker, Portland, Oregon.

The procedure in setting up the (*Turn to page* 106

AVIATION CAREERS INC.

(Continued from page 21)

peated. This leaves a student's second course with only five phases. Phase 12, a general summing up of both courses, fits in at the end of the last course taken. Here a student can demonstrate in practical application (on PT-19's, AT-6's, BT-13's, DC-3's, Sea-Bee's, and an XP-72) everything he's learned. During the first week each student pulls a 100-hour inspection. In the second week he learns everything he doesn't already know about CAA forms. The third week is spent on aircraft greasing and lubrication, and the fourth week on "cost estimation."

Two subjects—Phase 3, *Fuel, Lubrication and Induction Systems,* and Phase 4, *Electrical Systems,* both in the "E" course—are generally conceded to be the most difficult of the twelve. Instructor Leroy Tomlinson has been teaching Phase 3, which deals mainly with carburetors, for five years. Although he denies having done it, Tomlinson can reputedly disassemble and assemble a carburetor (flow-type or injection) in his sleep. He's been doing business with carburetors of one kind or another since 1914. "An aviation mechanic," Tomlinson points out, "does very little actual carburetor work but he must *know* carburetors in order to trouble-shoot an engine. Most engine trouble is caused by either the carburetor or the electrical system."

Tomlinson says that the main reason students encounter difficulty in his phase lies in their weak background in physics. Roosevelt instructors generally assume that the student is "green" in the sciences. Reviews in mathematics and physics are given from the ground up. A little boning up on these subjects before entering school is always recommended.

This last bit of advice holds for the other tough course too, according to Instructor Al Matlack, who has been teaching *Electrical Systems* for 13 years. During his 27 years in aviation Matlack has been a pilot, flight mechanic, and "everything but an actual engineer."

Matlack's course deals with the study of magnetism, electricity, primary and secondary circuits, ignition systems—both battery and magneto—theory of starters, generators, batteries, boosters, magnetos, and various types of wiring systems, ignition harness, shielding, switches, solenoids, and spark plugs.

The shop work consists of tearing down, repairing, and running-in serviceable magnetos, starters, generators, and other electrical accessories; trouble-shooting electrical systems on mock-ups; recharging batteries, and testing spark plugs.

Roosevelt Aviation School, established 19 years ago, is owned and operated by Roosevelt Field, Inc., which lies two miles east of Mineola, Long Island. Located on the west end of the field, the school consists of twelve white hangar-like buildings in which shop work and classes are held, three smaller lecture-room buildings, a cafeteria where a hot lunch can be had for 45 cents, and a restaurant where meals cost from 60 cents to a dollar. Though only forty-five minutes by train from Penn Station or twenty miles from Times Square, the school is as quiet and peaceful as the green and level Long Island countryside that surrounds it.

Roosevelt Field will go down in history as the take-off point for three famous flights—all in 1927: Lindberg's solo flight to Paris; the Chamberlain and Levine hop to Eisleben, Germany; and Commander Richard E. Byrd's flight to Paris that ended so unfortunately off the coast of France.

"Although nothing historic has happened lately," said W. D. ("Jim") Guthrie, old-time pilot and president of the port, "the field keeps busy providing complete airport service—hangar space, servicing and overhauling—to corporation and individual aircraft."

A typical school day at Roosevelt begins at 9 a.m. and ends at 5 p.m. with forty-five minutes for lunch. On Saturdays classes are over at 12:30 p.m. Each day's activities are broken down into about three hours of lecture and the rest supervised shop work.

The University of New York State requires one instructor to every twenty-five men in shop work. Roosevelt uses about one to fifteen. In all there are fifty-seven instructors, over half of whom are ex-Air Force men, including B-29 and P-51 pilots, navigators, and mechanics. Twenty-five are ex-students.

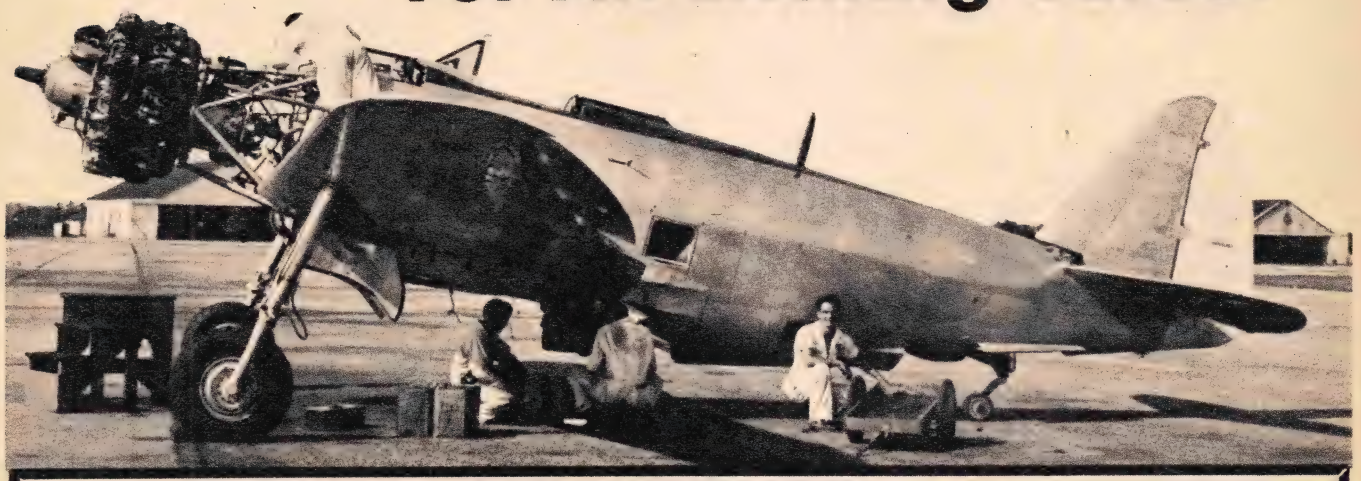
The enrollment fee is $25. Tuition for each course is $300. An additional $100 (which covers both courses) goes for tools and text books. Students from out of town live in rooms in private homes, arranged for by the school, where rent is about $7 per week. Some of these board with the families they live with, although lunch is more convenient in the cafeteria on the field.

Examinations for each of the two 24-week courses are given in three parts. A two-hour *written* exam—all multiple choice questions—is held at the CAA office on the field. Exam papers are sent to CAA headquarters in Washington and results come back a week later. Meanwhile the student starts his second course. If he passes his *written* he is then ready for the *practical.* This takes two six-hour days. He goes back through the six shops he has worked in to demonstrate his skill and accuracy. He has to convince the CAA Inspector that he knows exactly what he is doing. Accuracy rather than speed is stressed.

The purpose of the last exam—a 90-minute *oral*—is to test the student's understanding of theory, plus his ability to instruct men under him in their duties.

LOOK TO AVIATION

For An Exciting Career



— Photo by Harold G. Martin

Become a CAA-licensed Airplane or Engine Mechanic in only 24 weeks at Roosevelt Aviation School

There's an important place for **you** in the rising field of aviation—if you are a licensed aircraft mechanic. Best jobs go to young men who hold CAA licenses. Every aviation repair shop must have a licensed mechanic. Other mechanics, no matter what their experience, must work under direction of the man with a license.

Prepare now for your Airplane or Engine Mechanic's license at famous Roosevelt Aviation School. You may qualify in only 24 weeks for either license (or for both in 48 weeks)—if you are 18 or over when you complete the course. Instruction is thorough and practical. Ideally located on one of America's largest airports. Decide now to look to aviation for **your** career—and send in the coupon today!

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I'd like to know how I can become a licensed Engine ( ) or Airplane ( ) Mechanic in six months or both ( ) in 48 weeks.

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Cameron 2-Speed

(*Continued from page 48*)

contains the base and the cylinder housing in one casting. This is fitted with a large oilless bronze bearing for the crankshaft. The shaft is hardened and ground steel with a large diameter bearing and rotary valve. The front end of the shaft is tapered where it leaves the crankcase bushing to receive the tapered driving washer. This arrangement gives best driving action and is not affected by wear. A hard steel washer is placed between the drive washer and crankcase to act as a thrust bearing when the Cameron is used as an electric starter. The two-speed needle valve arrangement is made very compact by having the upper needle valve handle slightly shorter than the lower; they will interlock with each other as can be seen in the photograph.

The fuel recommended in the instructions of 4 parts alcohol and 1 part castor oil was tried with good results in the two-speed operation. Adding nitromethane to this fuel in place of part of the alcohol produced an increase of 1500 rpm. The extra power would not be required in most radio-control ships but would be of great help in control-line flying.

Parts Illustrated

1. Crankcase: die-cast aluminum, 1.48 oz. 2. Cylinder head: die-cast aluminum, 1⅛" dia., .25 oz. 3. Piston: steel, hardened & ground, .623" dia. x .640" long, .32 oz. 4. Cylinder: steel, .623" bore x 1⅛" long, .53 oz. 5. Wristpin: steel-hardened & ground, .170" dia., .04 oz. 6. Wrist pin pads: brass, .01 oz. 7. Connecting rod: aluminum, 31/32" long, .02 oz. 8. Glow plug washer: aluminum, .032" thick. 9. Glow plug: steel, ¼-32 thread, .08 oz. 10. Low speed needle valve: aluminum, brass & steel, .09 oz. 11. High speed needle valve, .10 oz. 12. Steel thrust washer: steel, .015" thick, .03 oz. 13. Crank shaft: steel-hardened and ground, .370" dia. shaft, .172" dia. crank pin, .75 oz. Drive collar: aluminum, ¾" dia., .21 oz. Front washer: steel, ¾" dia., 12 oz. Propeller nut: steel, ¼-28 NF thread, .11 oz. 14. Crankcase & cylinder head bolts: 3-48 NC thread, .11 oz. 15. Back cover plate: die-cast aluminum, 27 oz.

Engine Data

Performance. Weight: 4.52 oz. Propellers: 9/4, 12,800 rpm; 8/6, 13,500 rpm; 8/3½, 14,000 rpm; 7/4, 17,000 rpm; 9/4, 11,000 rpm on cold fuel. Fuel: 2 parts alcohol, 2 nitromethane, 1 oil. Fuel level test: 15" at 11,000 rpm.

Design Data: Displacement: .193 cu. in. Class: A. Stroke: .630 in. Bore: .625 in. Stroke bore ratio: 1.02. Compression ratio head: 5.5. Compression ratio base: 1.58. Port area intake: .049 sq. in. Bypass: .047 sq in. Exhaust: .071 sq. in.

Construction Features. Double needle valve for two speed operation.

Little Augie

(*Continued from page 39*)

it in place. The balsa streamline fairing will help to hold the rudder and stabilizer in alignment. After the tail section is finished sand the edges round.

Cover the fuselage in sections to get a good job. Water the covering and when dry dope the entire model with a dope that has been "cut" 50% with thinner. If you choose to color-dope the model go easy with the brush since any weight that you will add will detract from the flying.

Glide the model over a grassy area. If it stalls add weight to the nose. The glide should be straight and ten to fifteen feet ahead of you. After the model glides well (and all the gliding should be done with an empty jet) the jet can be loaded. When lighting the jet DO NOT LOOK IN THE TAIL PIPE! When you can hear that the jet is burning launch the model by running and letting it lift out of your hand. This way the model will not settle back to the ground due to insufficient initial thrust. To have the model circle, bend up one elevator at a time to produce a flat turn.

R/C Combo Meter

(Continued from page 57)

R2. The resistors R1 and R2 in the FSM shown are the ordinary ½ W. carbon variety, but they were carefully picked for correct value. If you don't have access to a quantity of these resistors, you can purchase what are known as "carbon film" resistors, which come in 1% tolerance, and are inexpensive. Ohmite Carbofilm type CP-½ will do nicely.

The milliampere shunt resistors R3 and R4 must be home made, since you can't purchase resistors close enough for this purpose. The approximate values are given on the diagram, but the only way to get them accurate is to connect the unit up to a meter of known accuracy, and calibrate by clipping the resistance wire to exact length. The sketch shows how this is done. Always disconnect the battery before adjusting the resistor. When the proper length of resistance wire has been found, it may be soldered to a couple of lugs or clamped in small binding posts. If a different make of meter from that specified in the parts list is used, these resistors may have to be of considerably different value. Resistance wire for them can be taken from old radio wire wound rheostats.

For field strength use (which simply means measuring the power your transmitter puts out into the air) a small antenna is required. Two feet of 3/64" music wire was used here, soldered into a banana plug from the BC-366. The longer the antenna, the higher the meter will read. However, there isn't much use in making it more than four feet long, and even two will give good readings from a properly adjusted transmitter, at a distance of 10 feet. As an example, the meter went to midscale, when placed on the ground about 12 ft. from the Mac-II transmitter; the same distance from a 3A4 triode job gave about a quarter scale reading. It is, however, much more reliable to use an antenna long enough to get a good reading ten feet or so away, rather than a very short one, with the FSM placed right next to the transmitter.

The meter will read higher if it is setting upon some metallic surface, such as a car hood. If you make it a practice to put it on the car, you can check the transmitter each time you set it up, noting if the FSM meter reads about the same. If it doesn't (and the meter is the same distance away), the transmitter might not be loaded up correctly, the batteries a bit low, etc.

To get a fairly close check on the transmitter frequency, always use the same length of antenna in the FSM, and put it in the same location; it is probably best to hold it in your hand for this test, since you will want to turn the tuning knob anyhow. Different locations (on a car hood, for example) and different antenna lengths will change the tuning a bit.

When you first put the FSM into operation, it will be necessary to adjust the coil core to the right spot. Set the condenser knob to mid-scale, and move the core till your transmitter signal shows maximum reading. With the components given, the tuning range is actually about 2 mc.; you could calibrate the condenser to cover the ham 10 and 11 meter bands, as well as the 27.255 mc. spot, if you want.

Just a note on testing dry cells; it proves very little to check them with a meter as sensitive as this one, unless they are loaded. The best way is to test them with the transmitter or receiver turned on; you then can see what the voltage is, under the actual operating conditions. Sometimes this is not convenient, though. It is quite practical to install "built-in loads" for the voltage ranges. The connections are shown dotted in the diagram.

The load resistors, R5 and R6, must be compromise values, since many different types of cells and batteries will be checked. The values shown for these resistors will give a full-scale drain of about 500 ma. on the 5V. range, and 50 ma. on the high range; thus, you would have a drain of around 150 ma. on a 1½ V. cell, and 45 ma. on a 45 V. battery. This will serve quite well for all the normally used sizes of batteries. A switch could be installed to cut out the

CO-ETTE

(*Continued from page 55*)

of required thickness. When making wing ribs pin punch one on 1/16" sheet pine and use this as a template for the required seventeen. Dash lines on the wing rib show where slots are cut after constructing the wing and should not be cut out until then.

When the formers are made, place the plan on a soft pine board and rub thoroughly with soap or place a sheet of waxed paper over it to keep any glue from adhering to its surface. Before laying down the longerons soak the two 1/8" x 1/8" strips that are to be used for the bottom longerons in warm water for about an hour. This will permit you to bend them quite easily to the shape shown on the plan.

In the meantime construct the rudder, as it will require about half an hour and will keep you busy. Pin the 3/16" x 1/8" leading edges in place. Glue in position the 1/8" sheet tips outline. Next cement the trailing edge of 1/8" x 1/4", then position the lower 1/8" sheet outline along with the strip of 1/8" x 1/4". Pin in the spar of 1/8" x 1/8" and the strip of 1/8" x 3/16" that fits above the stab. Next cut the piece of 1/16" x 1/8" to fit in place as shown.

To get back to the body, wipe the longerons fairly dry and pin in place—one on top of the other. Pin in place the other longerons and spacers as shown. Let this assembly set for several hours to allow thorough drying. Go on to the elevator and construct in the same manner as the rudder, using wood of the required size. Work carefully, using a liberal amount of glue and good light firm wood. Take the rudder from the plan and sand the leading edge round and the trailing edge to a knife-like shape. Do the same to the elevator, but taper the trailing edge as with the wings.

Now that the tail assembly is finished you can cover them. When covering with tissue or light silkspan, be careful to attach it only to the outline of the rudder and stab, and not to any ribs. This will give you a wrinkle-free covering after you water it.

Returning to the body, remove the sides from the plan and sand lightly to eliminate any bits of rough glue. Cut strips of 1/8" x 1/8" balsa into required lengths as shown in top view of body. When finished glue the sides together, using the pre-cut spacers. Keep the frame lined up. Upon completion add bulkheads 1, 2, 3, 4, nose fill-ins (sides and bottom only), and the side fill-ins that support the dowel at the rear. Glue in the window outlines, the gussets that support the wing dowel and the 1/8" x 1/8" stringers. Assemble the former that fits on the top of the body over the windshield and glue in place.

Before making the nose blocks study the diagram. The nose block for the rudder model is shown by the heavy solid line; the one for the CO_2 is shown by dash lines. Obtain a block of hard balsa 1" x 1½" x 2" and glue lightly in place on the front of the body. Shape this block as shown, fairing it into the lines of the body. When finished cut off the block and glue the two sheets of 1/8" balsa—laminated at right angles to each other—to the rear, to act as a plug. Drill a hole 1/16" diameter in the rear nose block; cut bushings from brass or tin and glue in place on the front and back to strengthen the block and act as bearings for the prop shaft. Cover the body with tissue or silkspan and spray with water. When dry give it and the tail assembly two or three light coats of clear dope.

Cut a trial piece of paper to get the exact shape of the windshield and then scribe onto celluloid. Glue in place by attaching it on one side first and allowing it to dry. Then bend it around and glue in place on the other side. *Don't* put the side windows on until you glue the wire rubber support in place. Cut a small rectangle in the front windshield for this wire. When the wire is in place glue on the side windows and the rear wing mount dowel which is 3/32" diameter and 2¾" long. Cover the nose block with tissue and give several coats of clear dope.

For the CO_2 powered model cut a bulkhead from 1/16" sheet plywood and drill three holes for the engine mounting bolts. Glue two sheets of balsa on the rear as described for the rubber block, and drill for the bolts. Attach the side faces of 3/16" sheet and the bottom fill-in of 1/8" sheet and sand to shape. Apply several coats of glue and cover with tissue. Bend six hooks from light wire and then glue them securely to the two nose plugs and the front of the body—see photo. Don't forget to leave two sections open on the bottom of the body for replacement of rubber or CO_2 cartridges.

Propeller. Obtain a straight grained block of medium balsa 1" x 1½" x 8" and mark off as shown. Cut to the shape shown by the heavy lines and start chipping away. Proceed carefully, carving away the back of each blade first. Carve about 1/8" under camber in the bottom

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and then carve the top to give an airfoil shape. The blades should be about 5/32" to 3/16" thick close to the hub, and tapering to a little less than 1/16" at the tips. Balance carefully and give several coats of clear dope, sanding lightly between each and balancing at the same time. Purchase a free wheeling device and glue securely to the prop hub along with a bit of brass on the rear side to act as a bearing. Cover the prop with tissue. Insert a length of 1/16" diameter wire and bend one end as a winding loop engager for the free wheeler. Slip on a ball bearing washer and the nose plug and bend into a loop—see plan.

Slide on a length of cambric tubing and put the rubber motor in place.

CO_2 Unit. Attach the motor to your CO_2 nose plug with three bolts and three washers which are placed on the bolt ends to give a larger surface to help support the nuts. Bend the brass air tube as shown. Fashion the landing gear from 1/16" diameter wire and solder two washers in place. Slip on the wheels and solder two more washers in place to retain the wheels. Slip this assembly into the slot in the body and glue securely. Attach the light wire tailskid.

Wing. If you can not obtain tapered trailing edge, cut a piece of 5/32" x 5/8" x 23" medium balsa to shape, and sand to a knife-like edge. Place the trailing edge on the plan and mark for the notches. Be sure to cut the notches accurately. Pin the trailing edge in place on the plan and then the ribs, gluing them in the notches carefully. Pin in place the leading edge of 5/32" and 5/32". Now slide the 18" x 1/4" spar through the ribs and glue. When dry remove from the plan and add the tips. Cut the wing apart, slot the five center ribs for the dihedral brace of 1/16" sheet pine, and glue securely. Be sure to get exactly 1 3/4" dihedral under each tip. Sand the leading edge to fair into the ribs. This is important for a smooth covering job. Fair the tips into the leading edge and the trailing edge. Cover the center panel on top and bottom, then the two outer panels—the bottom first, then the top. Spray with water and give two or three coats of clear dope. Watch for warps. Attach to the body with a couple of strands of rubber.

Flying the CO_2. Balance the model 1/3 back from the leading edge, adding clay to nose or tail if needed. When balancing during glides have an empty cartridge not a full one. For the first flight puncture the cartridge only a little to obtain low power. If the model stalls and loops then add a little down thrust. Do the reverse if it dives. To straighten the turn during climb add side thrust. After tests prove adjustments suitable, use full power.

Flying the Rubber Job. Balance the same as the CO_2 and give only 50 or 60 turns for the first flights. Add slivers of balsa for different thrust adjustments as required.

No matter what method of power your ship uses, if you turned out a neat job you're sure to have plenty of fun with this little free flighter.

SHOWCASE

TRY YOUR FAVORITE HOBBY SHOP FOR ITEMS PRESENTED HERE. ALL DATA CHECKED CAREFULLY, BUT IS SUBJECT TO CHANGE

CONTEST GOER

For International Wakefield competition and advanced rubber-powered flying, Berkeley offers the "Super Cloud" kit which sells for $3.95. This is a big model capable of extended duration flights; its wingspan is 51 inches; wing area is 210 square inches; flying weight of original is 8.113 ounces. Good trainer for F/F adjustments.

TEX'S TACKER

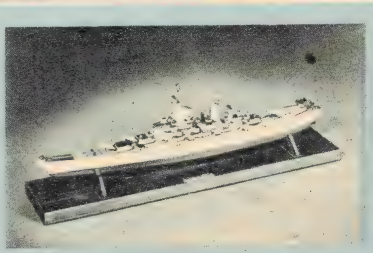
This new Ideal sail boat is a prefabbed affair designed by Tex Foster, famous model yacht authority. Hull is 18 inches long, permitting it to carry a goodly amount of sail. It's been christened "Sea Weed" by Ideal Models. The kit retails for $3.95. Still not too late to get in some model sailboating this summer!

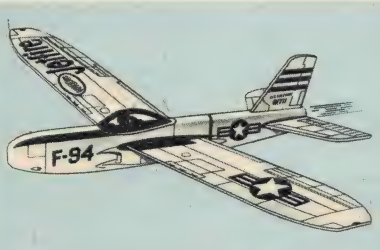
ROLLING STOCK

These are the new K&B streamlined wheels which come in four sizes: 1" diameter, 15¢ each; 1½", 20¢; 2", 25¢; and 2½", 30¢. Wheel hubs are aluminum. Axle holes are drilled to 1/16" diameter in the 1" wheels; 3/32" in the 1½ and 2" wheels; and ⅛" in the 2½" wheels. Tires are a sponge rubber material resisting fuel damage.

MIGHTY MO

A 20-inch replica of the United States battleship Missouri is the latest from Revell, producers of the Highway Pioneer antique auto kits. All-cast plastic kit sells for $1.98. Comes in grey; special details include guns, twin seaplanes and catapult launching gear. Beam is 2 inches; from waterline to radar screen, 8 in.





DID YOU SAY 10¢?

This new ready-to-fly Jetfire glider from Guillow features a colored plastic silhouette canopy arching over the pilot's head. Balsa model is printed in red and blue. Wing is 12 inches in span, features camber and dihedral. Sells for 10c; balsa sheet body is smoothed and streamlined. Authentic markings imprinted.

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CO_2 IGNITIONLESS
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"O.K." · OVER 10 YEARS OF LEADERSHIP ·

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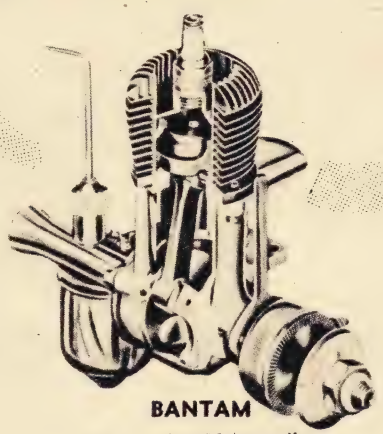

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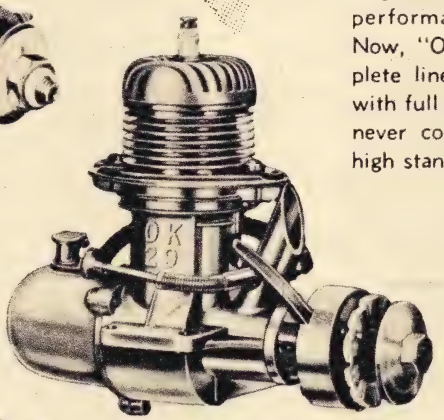

SUPER 29
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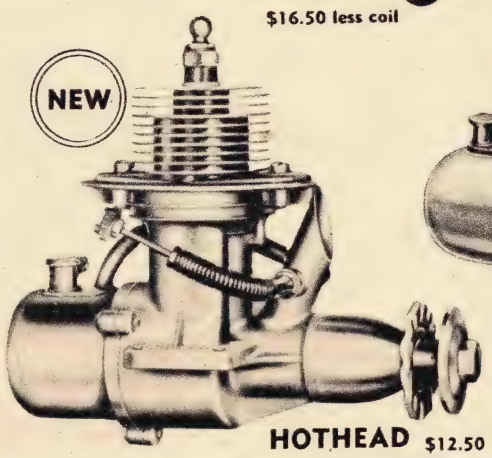
NEW



HOTHEAD $12.50
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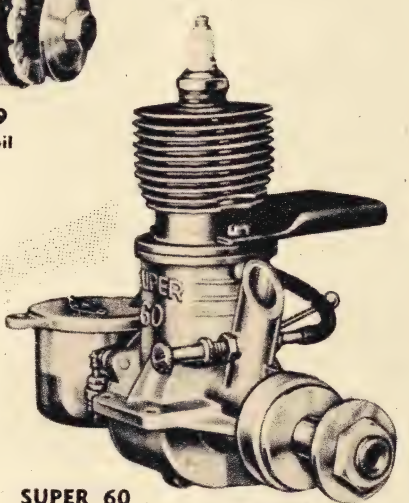
Don't risk ruining your present engine by conversion for Hot-Head is specially built to take the stresses peculiar to Glow Plug operation. Extra heavy crankshaft, drop forged connecting rod and oversized main bearing. Simple to operate. No timer, coil or condenser. Uses special fuel. Buy Glow Plugs at any hobby shop for 85c.

SPECIFICATIONS			
Model	**Displ.**	**Bore**	**Stroke**
Bantam	.199	.656	.590
Super 29	.299	.760	.660
Super 60*	.604	.900	.950
Twin	1.208	.900	.950
CO_2	.0178	.275	.300
Hot-Head	.299	.760	.660

*Super 60 also available in Raceway-Marine model equipped with flywheel. Price $23.00 less coil.



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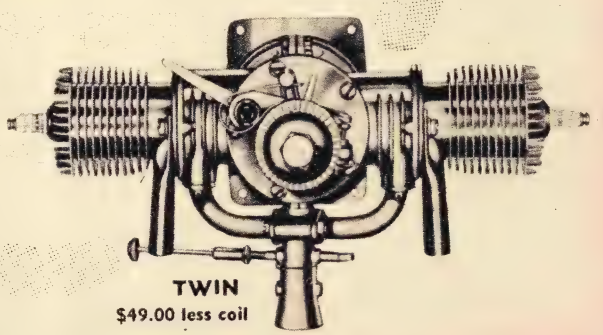

TWIN
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degrees, and the "down" side aileron returns to the neutral position.

The effects known as adverse yaw due to aileron action, present in most conventional planes, are eliminated in the Wheelair by the "differential aileron action" which causes the "down" aileron to remain, essentially, neutral while the "up" aileron is unaffected in its travel. Therefore, turns are made in this ship merely by turning the control wheel and coordinating with the correct amount of back pressure to hold the nose in level position.

The Wheelair is rendered spinproof and virtually stallproof by means of limitations on the upward travel of the elevators, although there is sufficient upward elevator movement to provide for a low landing speed.

We have said the construction is all-metal, but actually a small amount of plastic is used. The wing and fin tips are plastic and are easily replaced, though the plastic used is as strong or stronger than the usual metal. The nose and the extreme tips of the booms are of plastic also.

Interior appointments leave little to be desired. The cabin is more roomy than the interior of the average passenger car, measuring 48 inches wide, 52 inches high, and 114 inches in length. Long-legged fellows, and we belong to this fraternity, can adjust the front seat to any desired height as well as forward and backward; the backs of both seats can be pushed forward to accommodate shorties. Upholstery is of Airfoam, finished in a pleasant gray-green pastel shade in the ship inspected by us. The ladies can enter and leave the Wheelair with ease by means of a conveniently located step on either side, and the doors are of automobile style 43 inches wide.

The Lycoming's noise is not too great, and the insulated cabin further reduces it to a point where conversation at a low speaking voice can be readily enjoyed. Plexiglass windows are used throughout, and visibility is excellent both on the ground and in the air. Ventilation is easily regulated without danger of drafts, and a cabin heater is standard equipment. An overhead cabin light, arm rests, and adjustable sun shades add to the Wheelair's comfort. The instrument panel of plastic matches the color of the upholstery; a large glove and map compartment is within easy reach. Radio with overhead speaker, rate-of-climb and other blind flying instruments are optional extras, but provision is made for their addition.

The grouping of the standard instruments is unique and has to be seen to be appreciated. Every instrument has been situated in the most convenient position possible. Standard equipment includes sealed beam landing lights, starter, generator, airspeed indicator, altimeter, compass, tachometer, fuel pressure and quantity gages, oil pressure and temperature gages, an instrument panel light, and a battery of 145 Amperes capacity. A visual indicator located inboard near the boom on the left wing shows the position of the flaps which are hydraulically operated by a small lever slightly forward of the front seat. The brakes, Goodyear hydraulics, can be locked in position for parking.

The Wheelair has been designed for operation as a float plane, and plans include offering two floats and the necessary struts as extra equipment. Likewise a set of three wheel fairings will be available in kit form for easy installation. By adding an extra nylon fuel tank with a capacity of 25 gallons into the 24 cubic foot baggage space, the Wheelair's range, 600 miles, can be extended another 300 miles.

This new ship has many possibilities almost without number. Modification for a multitude of duties can be made, for the rear seats are easily removable, providing a large cargo space to the rancher, nonscheduled cargo operator, or sportsman. As a matter of fact this new Wheelair might someday come out wearing Uncle Sam's AF markings, because it is so easily adaptable to ambulance, liaison, and other military duties. Without wind she'll take off smartly in just 760 feet, and a landing can be made in 450 feet at 55 mph. Climb in the first minute of better than 750 feet per minute, and a speed ranging from 125 to 140 mph indicate performance and versatility for a four-place ship that leave little to be desired.

Several exterior color schemes will be available, but the first job's makeup, a pleasing combination of very light gray and bright orange, would please most anyone. The second ship, fast coming along, will be gray and bright green. The paint, something new in plastics known as "Duralac," is the product of the General Plastics Manufacturing Company of Tacoma, Washington. It offers several outstanding advantages for aircraft including proof against flame, gasoline, and water. The Duralac on the Wheelair takes a high polish, weighs only 8 pounds per gallon, is applied (one coat only, no primer) after merely etching the aluminum skin. It is highly resistant to acids, and so pliable it will not crack when the skin covering is bent or even sharply dented.

Probably the most strenuous objection to this new four-place two-control ship will come from veteran pilots who feel that any change from conventional types is unwarranted. From other sources may come the objection that the Wheelair is one of those planes that cannot be subjected to aerobatics or slipped into a small field. Those two contentions are true, but why would one desire to stunt a plane obviously designed to fill the needs of business men and flying families?

Space saving "slips" are virtually unnecessary because of the Wheelair's very large glide angle made possible by the unusually large flap area. The tricycle landing gear, moreover, makes it possible to fly the ship right onto the ground, and the brakes can be applied with safety a few seconds after touching down. The tricycle gear coupled with the two-con-

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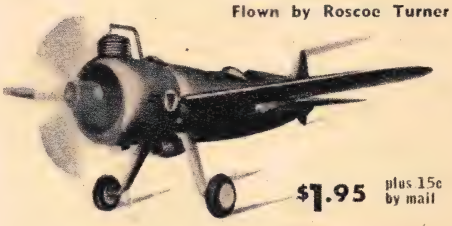

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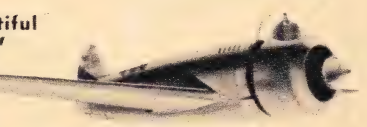

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trol system causes the ship to align itself with the line of motion, even after a crabbed approach and landing. Whereas the conventional aircraft has a tendency to groundloop at such times, the three-wheeled two-control ship shows none of these habits. In fact she handles just as sweet in full flight.

Performance

High Speed	140 mph
Cruising Speed	125 mph
Landing Speed	55 mph
Rate of Climb (1st Min)	760 fpm
Cruising Range	600 miles
Service Ceiling (Full Gross)	11,500 ft.
Take-Off Distance (No Wind)	760 ft.
Landing Run (No Wind)	450 ft.

Weights

Gross	2500 lbs.
Empty	1350 lbs.
Useful Load	1150 lbs.
Payload (Max.) (Incl. Fuel)	665 lbs.
Baggage Capacity	160 lbs.
Wing Loading	13.95 lbs/sq. ft.
Power Loading	13.10 lbs/h.p.

Propeller

Sensenich—Fixed Pitch Wood

Engine

Lycoming O-435-AP, 6 Cylinders, Horizontally Opposed, Direct Drive, 190 h.p. @ 2550 r.p.m.

Fuel and Oil Consumption

9.5 Gallons Gasoline per hour
1.0 Gallon Oil per hour

Dimensions

Span	37.0 ft.
Length Over-all	26.62 ft.
Height Over-all	7.25 ft.

WINGS FOR YOUR CAMERA

(*Continued from page 26*)

It is the mistaken belief of many that flight photography calls for particularly fast lenses and extremely high shutter speed. For all practical purposes a lens with an opening of as much as f:6.3 is entirely adequate, and in most instances the shutter speed will not have to exceed 1/200 sec., a speed available in most except the cheapest cameras. A telephoto lens is not necessary. Ordinarily the photographer will want to include a large portion of the sky or the ground and show depth in the aerial scene. The standard lenses with which all cameras are equipped will accomplish exactly this result, while the telephoto would only contract the view, bring near and distant objects closer together and also reduce the depth of the picture. For special close-up effects in pictures from a personal plane it is much more practical and much easier to fly within close range of the object than to fumble with lenses of varying focal lengths.

Accessories

Experience will teach the flying cameraman that not only should his camera be compact, but that accessory equipment should be held to a minimum. Essential accessories are: a neck strap, to prevent the camera from being seized from its owner's hands by the slipstream and inflicting serious damage on the airplane; a lens shade to keep extraneous light rays and stray reflections from striking the lens surface; and a series of two or three filters to penetrate aerial haze and to bring out the contrast between blue sky and white clouds. The slip-on type of lens shade and filter cannot be used in the air, because they would be carried away in the slipstream. Instead, a shade that can be securely locked to the lens rim by a set-screw should be used, and the same shade should have a threaded section for inserting the filter. Shades of this type, in sizes to fit all lenses, are available in all camera stores.

Filters and Aerial Haze

Filters are used extensively in aerial photography. In the air they serve the twofold purpose of bringing out contrast in objects on the ground and the clouds in the sky and of screening out some of the veiling effect caused by aerial haze.

Haze has always been a great problem in aerial photography. Much research is constantly being done on the subject and volumes have been written about it. Suffice it to say here that aerial haze is caused by a combination of tiny particles of moisture, dust, smoke, and other mineral and vegetable particles which are always suspended in varying densities in the lower strata of the air. They have the characteristic of scattering light from the sky and causing a blueish veil which increases in density with distance in the aerial view. Yellow, orange, and red filters are used to screen out some of these reflected blue rays, and the choice of a filter, from light yellow to dark red, will depend entirely on the amount of prevailing haze and the distance of the aerial view. Inasmuch as red filters call for considerable lengthening of the exposure, which is often impractical in flight photography, the yellow and orange filters are suggested as standard equipment. They should be adequate for purely pictorial views.

It should be mentioned in this connection that there exists a misconception among photographers as to the "magic" that can be accomplished in haze or fog penetration by the use of red filters or infra-red film. So far no formula is known—at least not in photographic science—for the elimination of all haze in an aerial view. Dense haze, and fog and clouds in particular, cannot be penetrated by photographic means. It is true

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Wing Span..... 50"
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For Engines .23 to .36 cubic inches displacement
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that maximum penetration is accomplished by the combination of red filters and infra-red emulsions. However, the infra-red film so far available to the amateur is extremely slow and its false rendition of color values usually results in undesirable pictorial effects. Hence the use of infra-red film is not recommended except for special purposes such as extreme long distance views.

Types of Film

As in all other types of outdoor action photography, the fast panchromatic films should be used in the air. When working with a miniature camera, however, one may prefer the slower panchromatic emulsions because of their finer grain and consequently better definition. The loss of speed in these emulsions is usually compensated for by the faster lenses with which the miniatures are equipped. Roll film, sheet film or film pack may be used according to one's preference and the type of camera used. However, film pack is usually preferred over sheet film because it contains twelve exposures in a compact package, whereas individual sheets kept in many separate holders might cause considerable inconvenience in the small space available in most planes. A camera gadget bag, or an army surplus musette bag, should be used to carry film and other accessories, so they may not get scattered about the cockpit and possibly interfere with the controls. The bag should be placed securely on the baggage compartment shelf, or its straps should be tied to a sturdy strut inside the cockpit. The camera fan using a small personal airplane will appreciate having all his equipment ready at hand in one container.

Exposure and Development

As a rule a photographer should guard against over-exposure in aerial views. Long exposure will always permit a certain amount of excess light to penetrate into the emulsion, even when a filter is used, and the result will be a soft and rather flat image. The crispness and brilliance so desirable in aerial views will thus be lost. An exposure meter is of little value in the air because stray light and reflected rays will result in inaccurate and misleading readings of the photo-electric cell.

The dark soil, grass, and large wooded areas of the ground appear dark from the air. With a medium yellow filter over the lens, 1/100 sec. at f:11 should be a good basic exposure when shooting vertically at the ground on a sunny day. Inasmuch as the reflection of light increases towards the horizon, the exposure should be shortened as the aim of the camera is being raised. Consequently an exposure of 1/100 sec. at f:16 should be used when the camera is pointed toward the horizon.

Clouds will be found to be much brighter on top than when they are viewed from below. From above, the brilliant sunlight striking the tufts of white cotton is reflected strongly into the lens, and extreme care should be taken not to over-expose lest the picture turn out grayish and flat. With an orange filter over the lens an exposure of f:22 should be used at 1/100 sec. when flying on top, to preserve the roundness and fine detail in the billowing clouds and to make them stand out sharply against the dark backdrop of the sky.

In black-and-white photography of the ground, early morning and late afternoon sun provides the best illumination. At such times the long shadows thrown by the low sun will make objects on the ground stand out from the background in sculptured relief. Patterns on the ground created by nature or by man's toil often produce some of the most striking aerial photographs. For pictorial effects it is usually advisable to shorten exposure in such pattern shots, to bring out the contrasting masses of light and dark and to hold back unnecessary and often disturbing small detail. Some of the most gorgeous patterns will be observed in the reflections of sunlight from the surfaces of large bodies of water. However, only by extreme shortening of the exposure can the fine detail in the brilliant highlights be recorded. At an exposure of 1/100 sec. the lens may be closed all the way to f:34 for this type of shot.

Careful development should go hand in hand with proper exposure in the production of a good aerial photograph. A fresh and active developer—not the soft-working type—should be used to bring out strong highlights and contrasts in the negative. The resulting picture, when printed on normal paper, will then have the desired brilliance and still retain detail in the shadow areas.

Photos from Airliners

Flight photographs can be made from practically every type of airplane. A trip in an airliner often presents fine opportunities for breathtaking views of the sky or the ground. Although the windows of an airliner cannot be opened, they should not be much of an obstacle in the way of the camera's eye. Spots of dirt and reflections of light on the glass are the principal causes of failure when shooting through the window of a plane. However, if the camera is held as closely as possible to a clear spot in the window without actually touching it, these difficulties can be easily overcome and the glass will have little effect upon the sharpness of the picture. In most airliners the seats in the rear of the cabin are best suited for the photographer, inasmuch as the view to the ground is not obstructed by the low wing. When photographing clouds in a skyscape, however, one should not hesitate to include part of the wing, the engines and the whirling prop. They will often enhance the view by adding interest and depth to the picture.

One should watch out for strong light reflected into the camera from shiny metal surfaces, which may fog and spoil a good photograph. The camera should be kept open and ready in the photographer's lap at all times. Because of the speed of the airplane, an attractive view that may present itself one moment may have changed or disappeared the next.

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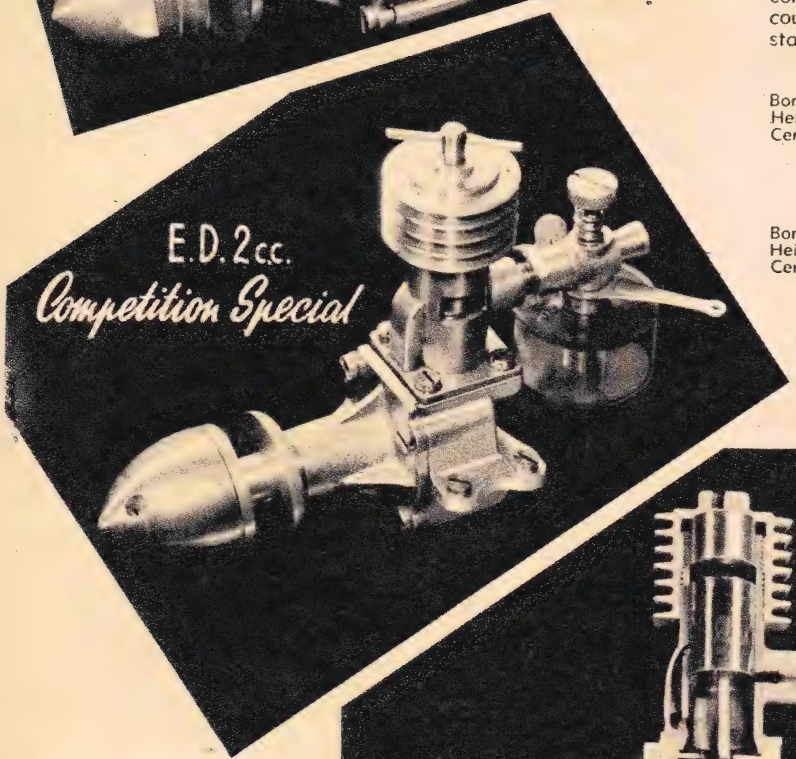

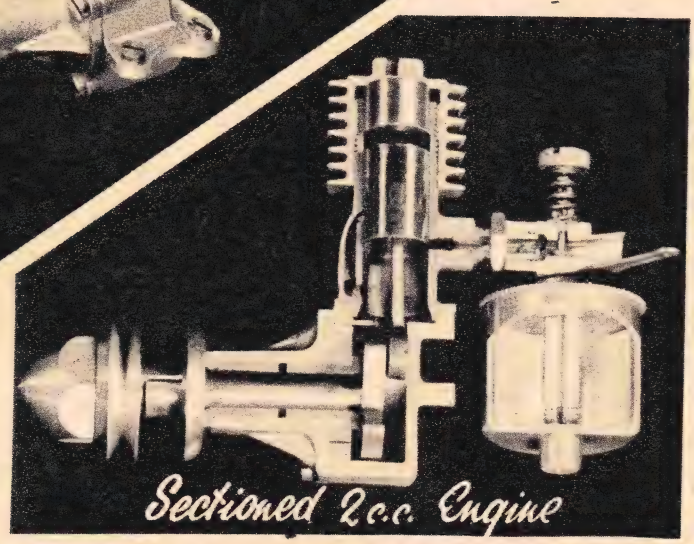

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An alert eye and a quick hand are prerequisites of the flying cameraman. Airline stewardesses are thoroughly familiar with the routes travelled by the plane, and they will be glad to help by pointing out interesting sights and landmarks when they are being approached.

Striking low-altitude shots of the ground can often be obtained when the airliner is banking in its landing approach to a field. Inasmuch as air traffic moves in a counter-clockwise direction over most airports, a seat on the left side of the airliner should be selected for this purpose. Never ask for permission to take photographs from the cockpit of an airliner. Rigid regulations forbid the pilot to admit any passengers to this sanctuary. According to most recent regulations flash bulbs may no longer be carried on airliners, because it was found that under certain circumstances they might be ignited by some of the electronic devices carried on the plane. Flash bulb manufacturers are trying to develop a safe container to overcome this handicap.

Photos From Personal Planes

The photographer who owns or rents an airplane has more freedom of action than the occasional traveller of the airlines. He has the freedom of timing and spacing his photographs in the expanse of the open sky to suit his own plans and purposes. In fact, the personal plane constitutes a marvelous tripod that can be swiftly maneuvered up or down, far or near. But the man behind the lens must be alert and quick on the trigger, because the tripod will never stand still and the subject will not pause to pose even for an instant.

Expert piloting is half the job of aerial photography, and the photographer will do well to select an experienced, skillful and safe pilot for the job. When cruising at high altitudes it is quite feasible for a pilot-photographer to trim his ship for hands-off flying and to snap an occasional picture of a skyscape. At low altitudes, however, piloting and photography should never be mixed, and plane and camera each should be in competent hands.

Although practically any type of airplane is suitable, the high-wing monoplane is usually preferred. The Piper Cub Trainer has been found especially adaptable to the requirements of professional and amateur photographer alike, because of its safety at low speeds, its maneuverability, and above all because one entire side of the cabin may be opened in flight. Most other airplanes have sufficiently large windows that can be opened in flight and permit adequate freedom of action for the operation of a conventional hand camera. Occasionally it may be necessary to have a door removed to afford the cameraman an unobstructed view. If this is done, the photographer should exercise special caution in fastening and frequently checking his safety belt, his camera should be firmly secured by a neck- or wrist-strap and all the rest of his equipment should be securely stowed away in a container inside the cockpit. Some pilots with little experience in this type of flying may have to be cautioned not to dive the plane when the door is removed or perform any violent maneuvers, since turbulence caused by the opening may place unusual strains upon the aircraft.

For photographs of objects and areas on the ground it is advisable to fly around the object in wide circles at a safe slow speed and to pick out the best angle and lighting while viewing it from all sides. Distance, height, and angle of view can be easily adjusted while circling, whereas the maneuvering would be found to be more difficult and less accurate when flying straight runs.

Turbulent air presents many difficulties on flights close to the ground. You cannot expect the pilot to fly a steady course, and you cannot expect to obtain clear unblurred pictures when the airplane is bouncing through turbulent air. The amount of turbulence may differ at various levels, and by changing the flight altitude it is often possible to escape at least some of its violence. With patience and experience it is sometimes possible to time the exposure to be made during the brief intervals of calmness that often follow a series of jolts. However, if the air is extremely rough at all lower levels, it is always advisable to return to the airport and to postpone the flight until better conditions prevail. The air is usually more stable in the late afternoon than in the earlier part of the day.

The pilot of the airplane is thoroughly acquainted with the Civil Air Regulations applying to low flying. They must be strictly observed, and the photographer should never ask the pilot to violate them for the sake of a picture.

The helicopter, because it can fly lower than the conventional airplane, because of its extreme maneuverability, and because of its ability to hover over an object, will no doubt be used extensively in the future for aerial photography. However, at present, few pilots have mastered its intricate controls, rental charges are far beyond the means of the average camera fan, and excessive vibration while hovering interferes considerably with photography. For the time being the aerial photographer will have to rely on the conventional wings.

At low altitude, where objects on the ground pass swiftly under the wings of the plane, the highest possible shutter speed must be used. For clear and sharp results a camera having a top shutter speed of 1/200 sec. should not be taken below 1000 feet. With increasing altitude the apparent motion of the ground becomes much slower and, theoretically, the shutter speed could be gradually decreased to 1/50 or even 1/25 sec. However, since there is always a possibility of motion resulting from turbulence and vibration, it is not advisable to use a speed of less than 1/100 sec.

Ground patterns, such as the crazy quilts of fields and pastures, the sweeping curves of contour farming, the straight bands of highways and railroads, and the scars and welts produced by mining, are best photographed from an altitude of several thousand feet.

The most exciting views are found high up among and above the clouds where the illumination is brilliant and the scenery changes continually. Up there one soars over a fantastic cloud-land of hills and valleys, crevices and gentle slopes, deep canyons and mile-high peaks. The alert cameraman will find unlimited picture material on such flights. But because of the swift changes in the shape, size, and grouping of clouds, quick action is necessary. A good opportunity once missed will never present itself a second time. When the sun sets behind a sea of clouds, their crests will be ablaze with flaming light, and long shadows will sink deep into the valleys between them. On such cloud shots, especially when they are backlighted, short exposure and a dark-colored filter should be used, to bring out the contrast between the highlights and the deep shadows. One should not hesitate to include parts of the airplane, such as a wing, a strut, or a window outline in such pictures. They will serve to frame and add interest and depth to the skyscape.

Certain precautions must be taken at high altitudes. No prolonged flights should be made above 12000 feet. Due to the lack of oxygen even the slightest exertion will quickly tell on an active man. Because of the low temperatures prevailing at great heights, the photographer must wear heavy clothing and gloves, and his equipment should not be exposed for long periods to the subfreezing temperatures of the outer air which will slow up or freeze the shutter mechanism and may cause the film to crack.

In another issue Mr. Groenhoff will discuss the art of photographing planes in the air and on the ground. Color photography will also be thoroughly covered.

DESIGNER'S DREAM

(*Continued from page 34*)

that not only flew but proved to be exceptionally stable! When, due to lack of financial and moral support, they finally quit, another English crank named Hill picked up the torch and carried on with a series of tail-less monoplanes and biplanes that kept the flame of research alight.

Concurrently, a trio of equally ga-ga Germans, Messrs. Lippisch and Horten, went even further along the road of dreams, building and flight testing a succession of true flying wings. Experimenting with both powered and glider designs, they tried a variety of configurations and control systems, gradually licking the problem in detail. Year by year, bit by bit, the hazy dream of the perfect airplane was slowly taking shape, solidifying component by component into hard, shining reality!

Meanwhile, another American had contracted the virus. Already famous in the

early days of the post-World War I aircraft industry, Jack Northrop was credited with the first monocoque fuselage, stressed-skin multi-cellular structures and an arm-long list of inspired innovations in airplane design and manufacture.

Long ridiculed by the industry "wise guys" as a nut on the subject of flying wings, Northrop's first venture in this direction was conceived as early as 1923 and flown in 1929. It was an unconventional single-seater of thirty feet span, with both the pilot and engine buried in the thickness of the wing. This original attempt was not a pure all-wing design, however, as it had a stabilizing tail supported on booms. Even so, its aerodynamic cleanness attracted a lot of attention among practical, objective pilots and I remember Clyde Pangborn's plan to fly it around the world in an assault on the existing record.

Northrop's next try was more ambitious and even more successful. The N1M was a simon pure wing that not only licked most of the remaining bugs, but served to revive and stimulate interest in the flying wing idea both here and abroad. Taking off in July, 1940, on her maiden hop, the N1M made more than two hundred successful flights during which problems of sweepback, dihedral, CG position, control surfaces, etc., were studied and solved.

Originally designed with stabilizing "droop tips" and powered with a pair of 65 hp Lycomings, the N1M featured extension shafts, pusher props, retractable wheels and a pilot's cockpit and engines tucked away within the 36" thick wing. She had a span of 38', was 17' long and had an area of 300 sq. ft. Her inherent stability proved to be so good that straight wing tips were later fitted, along with more powerful 120 hp Franklin engines.

With these improvements, the N1M's performance was so spectacular that it sold General Arnold on the combat possibilities of flying wings. In September, 1941, the Air Corps contracted with Northrop for the development of a flying wing bomber. Three months later, the drawings were completed and a contract was awarded for two planes to be designated XB-35. To provide scale model research data, four N9M models of 60' span were built and flown. Approximately one-third the size of the projected bomber, they duplicated its flight characteristics as closely as possible. Hundreds of hours of flight testing were chalked up and the performance of the big wings was accurately charted. Incidentally, the N9M's are still flying out at Muroc Lake, familiarizing pilots in the technique of flying wing operation.

Meanwhile, the war was on in full swing and the Northrop plant buzzing with production. With the B-35 temporarily off his mind, Jack Northrop turned to other projects. First came the design of a semi-flying wing fighter, the N2M (XP-56). This ship was unique in many respects, being a tail-less, contra-rotating prop pusher, with a swept-back wing, buried engine and novel controls. As if these departures from convention were not enough, she was also the first welded all-magnesium airplane ever built. Two of them were produced for testing but the XP-56 never saw service.

Next came an experimental contract for the development of an ultra high speed, twin jet, flying wing, pursuit plane, in which the pilot was to be carried in a prone position. Three glider mockups were built and flown, followed by the full scale fighter. This was also built of welded magnesium and incorporated the XP-56's split-flap, wing-tip rudders. It was designated XP-75 and nicknamed the "Flying Ram." Powered with two Westinghouse 19-b turbo-jets, the Ram has a top speed of 500 mph and shows great promise.

Following the XP-56 and 75 in Northrop's all-wing procession, came a series of flying wing buzz-bombs which arrived too late to see combat. Also about this time, came the initial test flights of the prototype XB-35. To date, these have been phenomenally successful, but considering that the big wing is by all odds the most radical large plane ever flown, Northrop and his boys are still keeping their fingers piously crossed.

Work had scarcely started on the XB-35 when a hush-hush British V.I.P., one Air Commodore Whittle, slipped into Washington with the hottest development in aviation since Cierva's rotating wing. In a flurry of super secrecy, the plans of his newly perfected jet engine were unfolded to a small circle of America's top designers, Jack Northrop among them. After excited conferences of the big brass, General Electric, with its corps of turbo-supercharger experts, was handed the job of developing an American version of the engine and Bell Aircraft drew the first plane assignment. The confabs broke up in a flush of quite understandable hypertension. The curtain was rising on a new era in aviation!

As soon as Northrop had digested the big news, his high pressure imagination went to work. A jet engine at last! His brain whirled giddily at the vista that opened before him. Here was a simplified power-plant with half the weight of the best reciprocating engines and twice the thrust—that burned cheap, non-explosive kerosene! An engine that had but one moving part and that a beautifully balanced compressor-turbine with practically no vibration! Here was an end to prop trouble with its headaches over extension shafting and complicated hub mechanisms! Eureka! Hallelujah!! Of course there was one catch. The confounded machine was weak on range—it gulped fuel like a thirsty camel! But what th' hell—that was just a temporary bug that would be licked sooner or later. The main thing was its unbelievable weight ratio and even more wonderful performance possibilities!

Although Northrop's projected B-35 was a "natural" for jet propulsion, many obstacles stood in the way of an immediate changeover. For one thing, Whittle's gas turbine was a revolutionary, new concept, relatively unproven and with big, red question-marks plastered over many

if its theories and components. It had to be built and tested, then redesigned for production, built and tested again. Its centrifugal compressor system had to be evaluated against that of the German axial-flow engines. Jet research was in more than just a state of flux—it was a violently boiling cauldron of engineering inquiry, with new ideas and designs constantly bubbling to the surface. Slowly, the research brains of General Electric, Westinghouse, and Allison were evolving new and improved forms of gas turbines.

It was early in 1945 before Northrop felt it safe to go ahead. He had been tipped off that General Electric's secret TG-180 would soon be ready for use. More powerful than the Whittle type, the new engine was also more compact. Carefully he studied the data. Length: 166 inches. Longer than the Whittle, but length would actually be an advantage in the flying wing—it would shorten the air intake ducts. Maximum diameter: 36¾ inches. Nearly a foot less than the centrifugal engine, it would nest more readily in the shallow trailing-edge. Weight: 2400 pounds as against the 3470 pounds of the Wasp Major powering the B-35—with extension shaft and propeller weight added to the latter. Why, the wing could take eight of the new jets without additional weight penalty—32,000 pounds of thrust as against the B-35's 12,000 horsepower! Of course, the jet wing would have to be a short range job, but her performance—*Wow!*

Redesigning the B-35 for jet installation was comparatively easy. The straight-through turbine airflow was a lot simpler than the convoluted ducting of the Wasps. Moreover, the jets could be set further aft in the wing, with track and hoist mountings for easy servicing and replacement. The directional stability contributed by the props would be lost, of course, but a set of four "air separator" fins would remedy that. Actually, the whole eight-jet power-plant would be more compact and better streamlined than the 35's four reciprocating engines!

On June 1, 1945, the army approved the plans and directed that two of the fifteen B-35's on order be changed to jet jobs and designated YB-49. The new plane is substantially the same as the 35, being 15' high, 53' 1" in overall length and having a span of 172'. The wing taper is four to one from a root chord of 37½' to a tip of 9' 4". Its thickness-to-chord ratio is 20% with a maximum thickness at the root of 7'. The YB-49 is a big ship. Weighing 88,100 pounds empty, it has a maximum overload weight of more than 200,000 pounds, thus carrying a useful load far in excess of its own weight! This amazing ratio of load to weight proves the inherent efficiency of the flying wing and vindicates Jack Northrop's long struggle to develop the type!

The normal operating crew of the YB-49 is thirteen men: pilot, co-pilot, navigator, radio operator, flight engineer, bombardier, and gunner, with a stand-by crew of six. They are comfortably

housed in large pressurized compartments in the center section of the wing, with bunks for the off-duty men. The pilot sits above the rest in a streamlined plexiglass bubble projecting above the wing's upper surface. Below and to his right is the co-pilot's seat with a single set of instruments and controls between them, equally accessible to both. The navigator's table and engineer's panels occupy the starboard side of the trapezoidal shaped main cabin and the radio operator's office the port. When ready for action, the bombardier lies prone beside the co-pilot, locating his targets and sighting through windows set in the leading-edge in front of and below him. Four capacious bomb bays, fitted for various sizes and types of missles, occupy the center section of the wing just outboard of the crew's quarters.

Defensive armament is formidable. The forward gunner sits facing aft in the rear of the pilot's bubble. He operates a remotely-controlled four-gun turret just abaft of him. A similar turret in the underside of the wing, protects the plane from below. The rear gunner occupies a sighting dome at the trailing-edge and is armed with a four-gun battery in a movable tail cone. Both men are equipped with retractable, periscopic sights. Twin-gun outboard turrets, above and below each outer wing panel, complete the armament.

Flight controls of the YB-49 are similar to those of the B-35. Large landing flaps, occupying the center sections of the trailing-edge, double in brass as service platforms when let down. The pitching moment they impose when lowered in flight are counteracted by wing-tip trim-flaps which automatically raise enough to compensate. Outboard of the flaps are "elevons" which act together for elevator effect and differentially for aileron action. Just inside the wing tips are "trim flaps" which trim the plane longitudinally. Mounted in them are split-flap type rudders, power operated to provide drag for directional control. Directional stability is further augmented by four fin-like "air separators." Actually, however, even with two engines out on the same side, the plane will straighten itself out without corrective rudder due to the inherent directional stability of the swept-back wing.

DESIGNING UNDER THE NEW RULES

(*Continued from page 49*)

area and three square feet of stabilizer area (lifting). It was powered with an old .60 engine which our .45's today compare with. Its glide is still remembered by all that saw her fly. Our new rules enable us to build ships of this type and we will probably see them once again. They won't climb like homesick angels. However, the glide won't be on the steep side.

Using the gas models we now have four classes devised to govern free flight and U-Control flying. Class A is .000 to .200 cu. in.; B, .201 to .300; C, .301 to .500; D, .501 to .650. A new class, E, .651 to 1.250 has been set up for radio control, flying scale and the like. The modeler who thinks that 4-cycle engines were out in the cold has a break as now 60% of actual piston displacement will be used for competition classification. All free flight jobs must rise off ground for record. Landing gear can be retractable but should be well built to afford a good take off.

The beginner will not have to worry that his model may be turned down by the judges on cross section requirements, as this has been discontinued. The builder will no longer have to worry if his model has the right wing loading as this rule has been eliminated. The only restriction now in effect is the power loading: 100 ozs. per cubic inch of piston displacement. A Class A with a .199 must weigh 19.9 ozs. However, this ship can be any size. The timing has been changed to a ten minute flight limit. Longer flights will be recorded as ten minutes with no penalty. A total of three flights will be recorded, instead of average.

The new rules will bring out a lot of floaters. This means that in order to get in our flights we will need a dethermalizer if we are to get all three with one ship. There are several types of dethermalizers. Carl Goldberg's is an ideal set up. This type of stabilizer is hinged at the leading edge and a timer allows the trailing edge to rise 30 to 45 degrees. This permits the ship to descend in one piece. Ships will not need as much dihedral since their large wing size will absorb the power, and the planes will fly slower. Thinner wing sections can be used along with smaller tail surfaces, as we do not need a large tail to reduce the wing loading as in the past. Larger models can be built lighter as they will fly and glide slower.

In the control line circle a minimum of two lines are required for safety. The control handle is limited to six inches beyond the hand of the flyer. Speed computations are to be made on standard lengths of line, Class A——42 ft.; B——52½ ft.; C——60 ft.; D (and jet)——70 ft. A pylon is required. You must fly three laps before the timing starts and fly official distances of five laps for Class A; eight laps for B; seven laps for C; six laps for D. Three timers are required for official flights with 1/10 second or better watches. Not more than 0.2 second maximum variation is permitted between timers.

On outdoor rubber-powered models the weight has been increased to four ounces

per hundred square inches of wing area. Now we can increase the weight with rubber and a larger prop. The new ships will now climb well and their glide can be helped with a little added incidence. The weight is present to enable the model to move forward and not settle. However, the additional rubber will require a strong back model to get the most out of the rubber that is added. The best bet is to add an extension to your winder handle. In this way the rubber can be wound without changing men in the middle of the job. It may be wise to keep the section of the fuselage a little large toward the rear as in this way the rubber will be able to unwind and not clog and break out the sides and the tissue.

A landing gear is required, but hand launching is permitted for record purposes. Gear can be retractable as long as the model can land without either wing tip touching.

The hand launched glider has a chance to get a new start. A lot of fellows in the past have not built these models since they could not figure wing area or did not have a scale to weigh them. Now all one has to do is to build a glider and show his stuff. It may be wise to build a larger wing now as the weight must not be so light as to retard the launch. The glider will still have to "get up there" if it is to do time. The extra wing area will produce the better glide.

Towline gliders are in for a face lifting. The gliders have to weigh four ounces per hundred square inches of wing area. The wing spars are the first that should get the added strength as then the wings will be stronger and will stand up better in the wind. The nose of the glider, where weight is usually present to balance the model, can be made of solid blocks, in this manner strengthening the nose, which always seems to be the weak spot when the ship meets a wall or fence. An air timer can be utilized with a dethermalizer without the ship going over weight. Here, too, only one ship is permitted per event. A large lifting stabilizer can be used to lighten the wing loading, but the C. G. must move back as well as the tow hook.

The CO_2 engines will compete among themselves and their flights will be recognized for record. The only rules that govern the design here is that the power must be obtained from one standard cartridge. This is not to be heated beyond body temperature. There is no wing loading, power loading or cross section required. This should result in getting a lot of the boys out to see what can be done with this type of ship.

Jets are also given a chance to show what they can do, as they compete in a separate event for speed. They are processed and timed the same as Class D control line gas jobs. Jet engines are limited to a 1¼" inside diameter tail pipe.

There are no changes indoors so these boys can keep trying for that 30 minute flight that seems close at hand.

Let's clear off that bench and get those ships ready for next year. (Haven't we heard that before?)

OLD NEEDLENOSE

(Continued from page 41)

feet. There the pilot will start the rocket motors, make a high speed run for about two minutes, and return to the Test Center. This operation will require about 30 minutes. During the few minutes the rocket motor operates, 3000 pounds of rocket fuel will be expended. Exact rate of consumption will depend upon the method of firing the rocket motors.

Skyrocket will take over in a speed and altitude region somewhat beyond that assigned the all-jet Skystreak. Whereas existing reliable test data cover speeds up to Mach .75 from sea level up to 35,000 feet and the Skystreak is currently investigating such data to Mach .85 over the same altitude range, officially, Skyrocket will explore the transonic region to Mach 1, over the same altitude range. Unofficially, it is capable of climbing very much higher.

To bring back the complete story of the effects of transonic speed, three types of recording instrumentation will ride with Skyrocket, all developed especially for this purpose. The accompanying drawing shows in profile the placement of this equipment. A photographic flight recorder will note on motion picture film the reading of a battery of flight instruments. This system will be used during first flights and control demonstrations. A pressure measuring system including an automatically recording manometer will measure air pressure at 400 points on wing and tail surfaces. Control forces and stresses in the structure will be measured by 904 electric strain gages and automatically recorded by an oscillograph. The diagram of the wiring and piping systems, you may note, somewhat resembles the human nervous system.

When the little craft, whose wings span a scant 25 feet, first becomes airborne, it will bring to fruition the dreams of Ed Heinemann, Douglas' chief engineer at the El Segundo plant. Heinemann's cool "Isn't that a beautiful job?" is a neat bit of understatement.

To complete the specifications record, Skystreak measures 45 ft., 3 inches from nose to rearmost point of the swept back tail, and stands only 11 ft., 6 in. high at the tail. You've got to add above five feet to the length, to cover the needle protuberance on the nose which carries airplane-like instruments for measuring yaw and pitch.

Skyrocket differs from Skystreak in both motive power and appearance. Skystreak, holder of the world's speed record of 650 mph, is powered by a General Electric TG-180 turbine built by Allison. Like Skystreak, Skyrocket carries a turbo-jet engine enabling it to take off, fly and land under its own power. This is the J-34, commonly called the 24C, built by Westinghouse. In addition, liquid rocket motors built by Reaction Motors, have been provided for use in high-speed runs. No details of the installation have been announced by the Navy, beyond the bare statement that in the arrangement of power plants and fuel systems extreme care has been taken to distribute fuel uniformly about the structure's center of gravity to reduce trim changes to a minimum during fuel consumption. Exhaust outlets also were carefully arranged to react through the center of gravity in order to have minimum effect on trim. In addition to the special fuel carried for the rocket engines, tankage for 250 gallons of aviation grade gasoline has been provided for the turbo-jet. Note that kerosene will not be burned, as in standard turbo-jets.

Company and Navy officials gave considerable thought to omitting the turbo-jet and using a mother ship, perhaps a B-29, to launch Skyrocket. It was finally considered more desirable to have the airplane operate under its own power throughout all flights, in order to develop low-speed flying qualities, rather than gain the slight increase in speed possible by omitting the turbo-jet.

A brief glance at the airplane indicates its family relationship to Skystreak, even though essential differences may be noted. Structural arrangement is quite similar. Magnesium alloy has been used for the greater portion of the fuselage skin. Wing and tail surfaces have been fabricated largely of tough 75S aluminum alloy. To overcome poor low-speed lift characteristics of the sweptback wings, special Handley-Page leading edge type, automatic slots have been provided. These are machined from solid magnesium bars, and smooth the airflow over the wings during landings. Should the automatic controls fail, the pilot can actuate them manually. Of interest, too, are the vertical vanes visible on the upper wings. Reminiscent of the vertical vanes carried by the Northrop Flying Wings, they serve to delay the spanwise progress of a stall during landing.

Because of the wing sweep and inadequate space, fuel and landing gear are housed in the fuselage instead of in the wing. This arrangement necessitated increasing the fuselage diameter considerably over that of Skystreak. Aerodynamic brakes are provided on the after portion of the fuselage for control of drag. Somewhat in the manner of Skystreak, the fuselage nose containing the pilot's compartment can be jettisoned for high speed escape. Cockpit is pressurized, and a refrigeration system pumps in cool air.

Control of the temperature within the pressurized cabin or cockpit of today's high speed aircraft presents a complex problem in air conditioning. Heat generated by friction as an aircraft passes through the air at extremely high speed may alone raise the temperature within the cabin more than 40 degrees. Other factors contributing to the rise in cabin

temperatures to a point far above that of the surrounding atmosphere are radiation from the sun, heat from the human body, and heat generated by the engine, radio and other mechanical accessories. The rise in temperature encountered when air is compressed for cabin or cockpit pressurization creates an additional cooling problem.

Ordinarily, 40 household size refrigerators would be required to do this cooling job, necessary to make the cockpit liveable at 760 mph. Here a tiny 16½ pound unit takes over. This assembly, developed by AiResearch, drops engine air temperatures from over 500° F. to less than 40° during flight. Without this unit, cockpit temperature would reach 212°, the boiling point of water, and the pilot would boil like a lobster in a kettle.

In comparison to orthodox refrigeration methods, the machine embodies an impeller wheel the size of a dollar. This miniature aluminum disk, vaned like a turbine and built of aluminum, whirls at 100,000 rpm—which is fast in anybody's language. The unit is expensive, but it saves a lot of weight. If ice were employed, 5½ pounds would be used during every minute, more than would melt in the oven at home at maximum stove temperature.

The Navy officially estimates that Skyrocket will beat Skystreak's record—perhaps by 100 miles an hour. That would make this a 750 mile-an-hour airplane! Despite this promise of higher speeds, it should be remembered that the airfoil sections are of conventional subsonic type, with rounded leading edges and contours, and not of the supersonic pointed type.

WACO U.M.F. SCALE CONTROL MODEL

(Continued from page 64)

facilitate bending them. When dry insert the ⅛" x ½" cross pieces. While the crutch is still over the plans, lay out the bulkheads. Use firm medium-hard ⅛" sheet balsa for the bulkheads. Cut out formers 2, 4 and 6 and glue firmly in place. To insert the balance of the formers, remove the crutch from the plan.

Be sure to cut out formers 1 and 3 to fit your fuel tank. This cut-out should be large enough to include the ⅛" sheet platform that extends from station 1 to 8 inclusive. Now cut out formers 2 and 4 to fit the 1/16" sheet platform for the bell crank. After the platforms are in place install the bell crank and pushrod. Use .010 shim brass for the fuel tank, and ⅛" diameter soft copper fuel lines. The fuel line to the engine extends to the rear of the tank and along the bottom of the tank. Tack this line to the bottom of the tank with solder. When installing the ignition system have good firm solder joints at all points. This is a permanent system and is enclosed within the planking. Any mistakes will necessitate cutting apart the finished work. Note the

sandwich type firewall—this type gives maximum strength with a cushioning effect from the soft center core of balsa. The 1/16" plywood insert in the 1/16" balsa ring is for mounting the engine. Before gluing the plywood insert layout for the engine mounting screws, drill these holes. When it is glued in place drill the holes through the balance of the firewall. Install the 6/32" mounting screws through the firewall. To prevent the screws turning when installing the engine, solder a single soft copper wire to the top of a screw head and then extend the wire to the head of the next screw, solder, and then extend it to the last screw. A firm coating of glue applied to each screw will prevent any in-or-out movement. Install the 1/8" sheet stabilizer cradle. This cradle is mounted on top of the crutch and butts against the rear face of bulkhead #11. The landing gear and tail wheel are next installed.

The center section of the bottom wing and 1/16" dia. wire upper wing strut completes the basic construction. Plank the fuselage as shown, using medium soft 1/8" x 1/4" balsa for the planking. When the planking has set, install the 1/8" square stringers. There are 11 stringers to the side. To lay out these stringers, insert the first stringer in the bottom dead center to the fuselage. Install the stringer on the side center of either side of the fuselage. Follow the stringer locations shown on the side view of the fuselage. Remember that these stringers extend to the absolute rear of the fuselage. Carve a head rest from a block of 1/2" x 5/8" soft balsa and glue it directly to the top of formers 8 to 11 inclusive. The 1/16" sheet fillet covering on the lower wing completes all the construction of the fuselage. When the glue has set, all this construction must be sanded thoroughly. A good sanding job at this time will result in a good looking job when the finish is applied. The 1/4" sheet landing gear fillet is notched and sanded to a tear drop shape as shown in the perspective view of the landing gear. This fairing is not glued to the fuselage, but is a seperate unit which will allow bending moments of the landing gear without cracking.

The engine cowling will complete the fuselage. This cowling is quite simple to make. Lay out seven 3 5/8" diameter circles on a sheet of 1/4" medium hard sheet 4" wide. Lay out a 3" diameter circle in five of the rings, a 2 3/4" circle in one ring and a 2 1/2" circle in the last ring. It is simpler to cut out the inner ring before attempting to cut the outside or large diameter. Lay out 3 5/8" diameter ring on a piece of 1/16" plywood. The inner section of this ring is cut out to fit around the engine. Two holes are drilled in this ring for 1/2" No. 6 roundhead wood screws. These screws hold the engine cowling in place. The next step for the cowl is to make a cut-out on the outside of the ring to clear the cylinder head of the engine. Sand the cowling to the outline shown on the side view of the fuselage. The rocker arm housings are formed of soft balsa and shaped as shown on the side and top views of the fuselage. A good sanding of the completed unit is now in order. Be sure to install the rocker arm housings. They provide those valuable added points for detail when the model is judged at contests.

The stabilizer, rudder, and wing are of conventional construction. The wing strut supports will require some careful work. Use medium hard 5/16" sheet for these parts. The strut supports in the bottom wing are glued between the wing ribs as shown. Be sure to leave enough of the wood projecting above the top of the ribs so that it may be formed to the contour of the wing ribs. The support in the upper wing is glued flush with the bottom of the wing ribs. Wing dihedral is shown in the front view of the model.

Before applying the color scheme be sure to fill all wood sections with a good grade of wood filler. Then sand thoroughly until all wood grain has completely disappeared. To achieve this, it is necessary to apply many coats of filler, sanding well between each coat. Use 400- to 600-grit wet or dry paper for these sandings. A good homemade filler can be made of equal parts of good talcum powder and clear dope. Mix until it assumes a pasty thickness and then brush on. Silk was used for the covering on the original model. If this is not available use the gas model grade of silkspan. Be sure to use enough clear dope to fill all the pores of the covering material.

For the color scheme: the Army and Navy trainer versions were Royal Blue and Yellow. The fuselage and rudder are blue and the wing and stabilizer are yellow. Some of the privately owned versions used a red and white combination—all red with white trim and details.

The Army and Navy versions did not use the wheel pants and landing gear fairing struts. They were used only on the private jobs. However, we would suggest using the pants and fairing strut no matter what color scheme you may use. After the model has been completely assembled install the heavy linen thread to simulate the guy wire bracings. Use a large needle to thread these bracings through the "N" struts and fuselage. Glue at all points where this thread is in contact with the plane sections. Use 3/16" x 1/4" fairing strips over the upper wing struts. Lay out the aileron sections with India ink on the wing panels. A ruling pen is used for applying these lines. Install the 1/8" dowel aileron struts.

All of the details mentioned above add much to the finished appearance of your model. They will also produce many points in those beauty events.

Flying: Don't use the wheel pants in the initial test flights. Be sure to use 1-A smooth, level take-off spot for flying. Use 3/4 power for the first flights until you are thoroughly familiar with the model. Try only straight and level flight for the first few times—no stunts until you are completely familiar with the model. Then install the wheel pants and cut loose with full power and all your tricks.

SOLO CLUB

(*Continued from page 27*)

If you are much higher, you won't be able to observe surface conditions effectively, and at about 1500 feet you are likely to find yourself playing tag with someone who is also giving the field a preliminary look."

This veteran pilot also points out that surface conditions may change between the time you observe them from 1500 feet and when you get down to landing altitude a few minutes later (having passed the field and descended to landing altitude of about 600 feet to enter the pattern).

My comment that you should enter the pattern from an angle of forty-five degrees makes Mr. Knouff "have difficulty in remaining calm" because he has had so many close calls on account of that rule. He explains that the rule itself is not so much at fault as the multitude of interpretations given it. He points out that many pilots forget that the Civil Air Regulations require that all turns in an airport traffic zone (a circle about the field three miles from its center) should be to the *left* unless otherwise directed. He has many times seen pilots fly to the right around a field to a point midway between the ends of the runway on an upwind heading, make a 135 degree right turn, level off for a moment and then make the forty-five degree turn as legally required—on the down wind leg right smack in the middle of traffic! This pilot thinks we should put more stress on the CAR that says that *all* turns within three miles of the center of a field should be to the left, and adds that if you must turn to the right you should be alert enough at all times so that a bank of more than ten degrees is not required. And don't forget to look out the right side of the plane as well as the left, before you start to turn!

Mr. Knouff's procedure in landing at a strange field seems to make pretty good sense. He makes his approach from landing pattern altitude at least three miles from the field, keeping his nose well to the right of the field and traffic and any aircraft ahead of him at his altitude. He can then circle the field as close as traffic will permit, checking on wind direction and surface traffic. When a suitable "hole" appears, he enters the pattern. He points out that any entrance into the pattern at less than the suggested forty-five degrees cuts down the speed at which you close with any nearby aircraft, so the smaller the angle of entrance into the pattern the safer it is for all concerned.

Mr. Knouff suggests another excellent safety measure. His rule is that neither he nor his students pass in front of another plane whose propeller is turning unless the other pilot signals to do so with his arm outside the aircraft. If he signals with his arm inside the plane it just doesn't count! The only exception to this "take your turn" technique while

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Any Month: Know any budding cartoonists? model designers? full-scale aviation or model photographers? Tell them *Air Trails Pictorial* is always on the look out for the newest and the best. All contributions receive the same careful consideration.

—The Editors.

on the ground is that an aircraft which has completed its landing roll and is clearing the runway should have the right of way over any ship taxiing out for take off. The latter should turn at least forty-five degrees away from the runway and stop if there is the slightest possibility of collision or any uncertainty as to the course of the plane that has just cleared the runway. That seems a smart procedure at any field. When I land at a field they usually adopt a different one. All aircraft not airborne taxi back to the hangar wide open and go inside, the gas pumps are locked and all personnel head for town at top speed. This is known as "Operation Scatter."

I'm glad this veteran agrees with my belief that it is possible to cut down the horsepower and performance of aircraft without losing any of the fun of flying. He witnessed an incident which supports my claim—though the low horsepower ships in the yarn were Howard NH-1's (four-place cabin jobs with a cruising speed of about 130 mph). A group of fighters and dive bombers left Columbus, Ohio, for San Diego, Calif. That night Mr. Knouff and another old timer rode the airliner to Chicago. The next day they picked up a couple of the Howards and took off after the Navy stuff en route to the Coast. To make a short story shorter, they caught the fighters and dive bombers on the way, passed them, and arrived in San Diego first. The reasons given are: less mechanical trouble, faster refueling and easier starting, plus the fact that they could fly under conditions that were hazardous to the faster ships. I'd still like to see what some manufacturer could do with a really light (twenty-five horsepower) power plant and a really light plane—provided the CAA could be convinced that such an aircraft could be safe as well as a lot of fun to fly.

Now let's look further into the mail basket.

We are always glad to have a Canadian or a glider pilot join us. We hit the jackpot in the next applicant, for he is both. Mr. Allan D. Rutherford, of Winnipeg, Manitoba, Canada, holder of Glider Certificate No. 113 issued by The Soaring Association of Canada, sends in his request for membership. Come right in Mr. Rutherford and why not drop us a line about the SAC? We'd be tickled to hear about it.

The next letter asks a question I am delighted to answer. S/Sgt. Allen E. Hall, USAF, Washington, D.C., wants to know if we have many Service members in the Solo Club, for he saw a pair of wings worn by another service man which certainly resembled the Solo Club insignia. I can't say of course that the other chap had on our wings, but we do have several hundred service and ex-service Solo Club members in our files. We're glad to have them with us, and the more the better.

Another kind of a Sergeant writes the next letter—new member Harold Luther Bennett, Police Sergeant, of the city of Walnut Creek, California. Sgt. Bennett made his solo flight at the Sherman airport of that city, according to his application—and who am I to argue with a police sergeant? Come to think of it, it would be interesting to know just how many different professions we have in our membership. From the letters I know there are ministers, police officers, service men, writers, doctors, students, airline personnel and farmers. We certainly are a cross section of those who make up the flying public.

From Philadelphia member John C. Winter reports that according to all the rules of superstition his second solo should have been his first one. His first actual solo, on Friday the thirteenth, was quite commonplace. He passed the test with a nice round of the field, good approach, and a smooth three point landing. His second solo ran true to form for a Friday-the-thirteenth flight. The wind did a ninety degree shift and stepped up to twenty miles an hour. The field had only one runway. Fuel began running low. John gave another look at the needle pointing at "empty," decided to take a crack at a cross-wind landing, even though it was new stuff for him. Well, members, we don't have all the hair raising details, but he says "all that shattered was the tail wheel and my nerves, but a mechanic and a cigarette fixed each respectively." Nothing like a walkaway landing on one of your first solo flights to give you a healthy respect for the law of gravity and a well built aircraft! I've often thought if there was only some way to *safely* scare the daylights out of all students when they reach that cocky stage after a couple of dozen solo hours, it might be a good thing in the long run. Glad to hear from new member John Winter, and let's hope the next windshift will find him a veteran at cross-wind landings—or equipped with caster-gear.

We want to hear of all the "haps" and mishaps that you members run into so that we can pass them along to the others, and how about some photographs of you and your aircraft? Just send your snapshots in with your name, address and membership number on the back.

In closing I want to mention a grand letter which came in a while back. It was such a good letter I put it away to be sure to include it in a future department, and I put it away so doggoned well I just now found it again. My apologies for my delay to Steven Sowka, of Scranton, Pa. Steve belongs to the Glen-Aire Flying Club and sent me a copy of his club's by-laws and rules. I looked them over and found them excellent. One rule is that if a member breaks an appointment to fly without adequate advance notice, he must pay a fine of a dollar. Good idea for all clubs, to discourage those chronic "gosh-I-forgot" members who tie up a ship and never show up on time to fly. Another club rule I liked was the one which read: "Students will adhere to CAR, and any violation, no matter how small, will be met by a fine to the club treasury." My only suggestion is that this rule should be changed to read "all members (rather than just

students) will adhere to CAR."

Steve, who lives at 1437 N. Lincoln Ave., has a fine collection of World War I three-view drawings that belonged to his brother "who was a model builder and who was shot down over Belgium while piloting a B-26." Many thanks for your fine letter Mr. Sowka.

That's all the room we have for this time. Be sure to pass the word around that we are interested in photographs for our club pages, as well as the letters about your experiences and ideas for better and safer flying. Until next month, good flying weather, good fun and good sense!

MICRO-DIESEL

(*Continued from page 53*)

pression by turning counter-clockwise on the adjustment screw, the compression between the cylinder sleeve "plug" and the piston forces the sleeve up.

The actual head is machined from aluminum and screws into the cylinder. Two holes are drilled in the top for a spanner wrench. The adjusting screw is steel, to cope with the pressure of holding down the sleeve.

Piston is steel, hardened and lapped to the sleeve. No oil rings are used, for the fuel mixture itself has ample lubricating properties.

There is no wrist pin. The Micro uses the ball and socket arrangement. A lock ring holds the ball end of the rod to the socket of the piston.

Connecting rod is bronze, machined smoothly and has ample strength. Crankshaft is made in two pieces. The counter-balance and shaft are one unit and the crank pin is another piece. Two large holes are drilled to make the counter-balance. The shaft is hardened and finished smoothly. Crankshaft bearing is bronze and is an excellent fit.

No timer cams or keys are needed, of course, for there is no ignition system. Rear propeller washer is steel and fitted closely to the shaft. The prop is held in place by a large hexagonal aluminum spinner. Rear case cover is turned aluminum, and screws into the case.

Intake tube is brass, and threaded to screw into the rear of the cylinder barrel. A brass lock nut holds the tube firmly. Needle valve body is also brass, the needle itself being steel with a blunt point. The threaded collar is brass.

The tank cover is also aluminum, machined smoothly. A Gits cap is provided as a filler.

The lower portion of the tank or cup is pressed aluminum. It is threaded on the inside so it screws on to the tank cover. A section of the lower region is knurled to make it easy to hold the tank when removing it. A plastic feed line runs from the needle valve body to the bottom of the tank for the full pick-up.

On Strobotac tests the Micro revved up as follows:

9" x 4" Mercury prop	7900 rpm
8" x 6" Rite Pitch	6300 rpm
10" x 6" Tornado	4800 rpm

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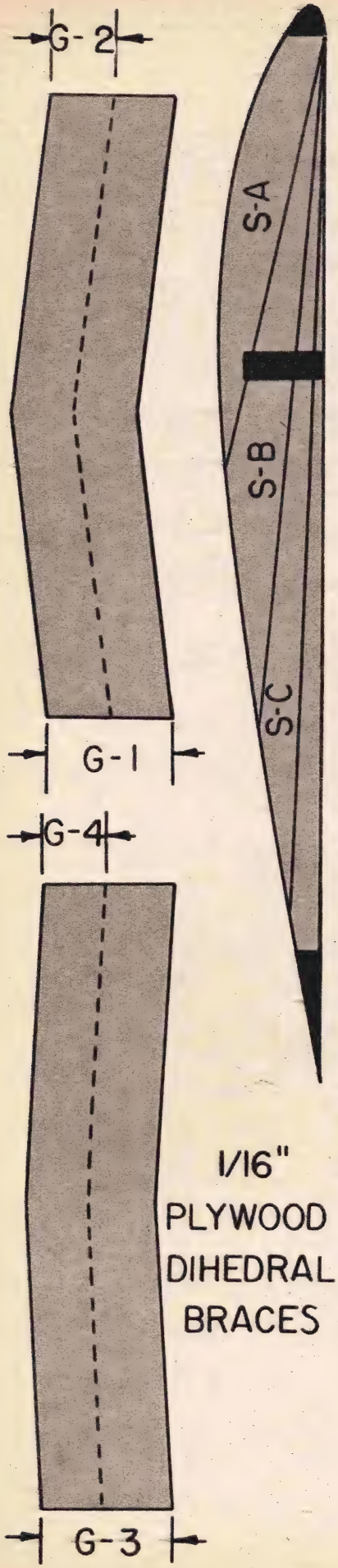
NU-LOOKER

(*Continued from page 49*)



with the sheet planking around the pylon. The stringers are now cemented in place. Glue the bulkheads well and sand between them. This will allow the covering to stretch properly and not let the bulkheads show. Cement the engine bearers in place. Work carefully here, as they will take a beating. Cement in place the balsa block as shown on the plan. This is hollowed to clear the crankcase. The wing rest is cemented in place atop the pylon. This should be cemented securely as it has to support the wing and must be lined up true.

The landing gear is needed for record purposes, but none is needed if the ship is to be flown in contests only. The cowl is cut to shape and held in place with small screws.

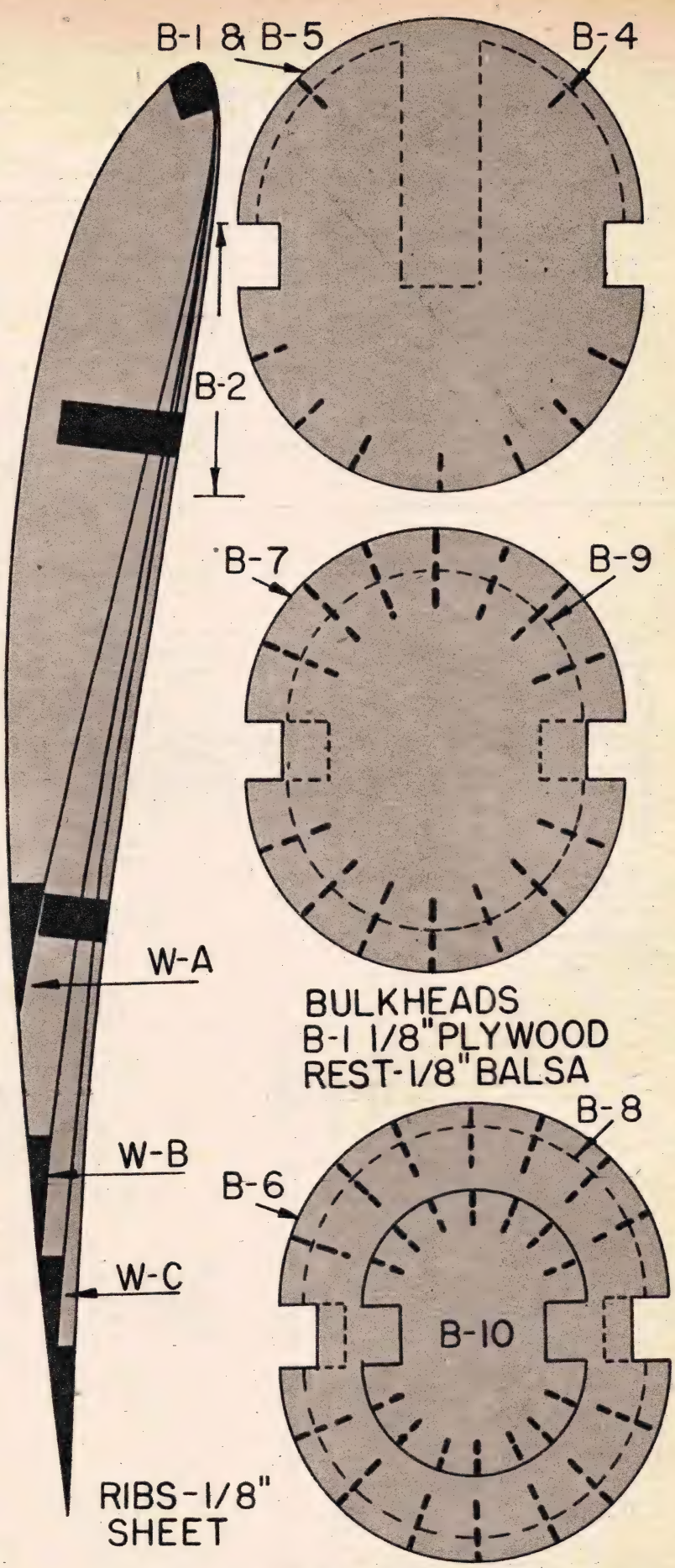
Lay out the wing plan full size. Cut the required ribs from balsa stock that has a speckled look (quarter grained), since it is best for this job. Cut the spars to length and assemble with the ribs. Place small pieces of scrap beneath the spars. Pin them in place while the cement dries. Add the tips to the wing and shape. Cut out the wing section and join with gussets to both sides of the wing spars. Cover the center section with sheet balsa, since this will have to be sanded to fair into the leading and trailing edges.

Enlarge the stabilizer to full size. Cut out the outline of the stabilizer and ribs together with the spar, and assemble. The rudder is from sheet balsa. Sand to shape. Cement this to the stabilizer, adding a rib to both sides.

Cover the ship with silkspan. Apply wet, and trim it a little over size. Even it out and cement along the edges. When dry, dope and sand lightly.

When ready to test fly, first glide the ship. The large size of this ship and its light weight will permit it to glide slowly. Don't throw the ship but run into the wind with it and let it rise out of your hand into a glide. A large prop will work since the ship is large. A small prop will slip even if the engine screams its heart out. Work on the glide carefully until the ship turns tight. That is the best way to build up time. Be sure to employ a dethermalizer or you won't have the ship long, since its gliding ability is well nigh perfect.

(*See next page for more plans.*)



IMPROVED FLIGHT TRAINING

(*Continued from page 29*)

who can afford to fly—the stolid, conservative, well-fixed businessman who will buy an airplane for his cross-country business trips.

"Right now, it frightens away that type of fellow by drilling into him a fear, by wasting his valuable time in requiring him to learn many things he doesn't need to know to use his plane, by failing to teach him the things he does need to know.

"Instead, present training methods tend to attract mainly the devil-may-care lad who often can't spend the kind of money it takes to own a plane for pleasure, and doesn't have the business use to justify it."

Brown has an idea that aviation schools could profitably take a tip from auto driver schools.

"In motoring," he says, "those things that get most drivers into trouble are driving too fast, passing on hills or curves, or losing control on slippery streets.

"But in spite of this, you never heard of a school instructing motorists in safe driving suggesting that their students practice and be tested on these dangerous maneuvers. You never heard them suggest that a driver, before he may get his operator's license, should drive too fast, skid intentionally on wet roads to see if he can get out of it, or pass another car on blind hills or curves.

"Wouldn't it be wise, in flight training, to begin stressing how to *stay* out of trouble with an airplane, rather than how to *get* out of trouble, and to practice normal safe operation rather than the wild and woolly emergency procedures?" Brown asks.

Brown has stumped up and down Ohio, suggesting the changes. He spoke at some aviation clinics. To his surprise, he found other aviation people were agreeing with him.

It provoked a lot of discussion particularly at some joint CAA-state aviation clinics in the third region, of which Chicago is headquarters. And at the last one at Chicago, it jelled into this resolution:

"Whereas, since there is considerable question as to the effectiveness of the present private pilot curriculum and flight test in turning out pilots who are safe and yet can realize the full utility of the airplane, be it therefore resolved that the CAA be requested to re-evaluate flight training curriculum and pilot test requirements influencing such curriculum, and for this purpose they conduct a flight training research program, giving immediate attention to the possible elimination of simulated forced landings, pylon eights, spins and power-off spot landings and to utilize the time saved in additional cross-country training and strange field techniques."

The Ohio U. experiment is the result.

The University has had a big flying school for some time, a staff of nearly 15 instructors under Ralph Smeck, director of the school of aviation, and "Ole" Olson, director of flight training. And it was an ideal place for the experiment. At Athens, 300 students, chiefly G.I.'s, were picked as guinea pigs. 150 are being given the standard flight course, the other 150 the new course—simultaneously. Thus the results may be compared.

"The big trouble," complained Brown, "is that we asked for volunteers. And we had trouble getting the students to take the standard course. They all wanted to take the new course."

The course starts right off with a cross-country hop, the first lesson, while the student still is bewildered about the whole business. And it keeps him constantly on the go, visiting strange air fields throughout the eastern Ohio area, even while it crams into him all those practical things, rather than the theoretical things, he needs to know about cross-country flying. It instills into him a consciousness of weather, a knowledge of the versatility and practical uses of an airplane, gives him ideas on navigation and how to land on strange fields, in contrast to the ordinary private student who usually gets into only a few strange fields in his training.

The course provides also some training on stalls and spins—but not enough to frighten the student—and some instruction on rectangular courses, perhaps even a simulated forced landing or two, but entirely as an adjunct to his cross-country training.

Brown refuses to see any particular value in forced landing practice.

"How often do you have engine failures, anyway?" he asks. "You send a fellow out without any instruction in simulated forced landings. His engine quits. So he calmly sets the plane down, thinks about it later, decides it wasn't so much to worry about.

"But take the fellow you've been drilling with the idea that he may some day have a forced landing. His engine quits. He says mentally: 'Oh! Oh! This is the terrible thing that they've been worrying would happen to me. Am I good enough?' And he jams up inside."

The primary objective of the course, says the CAA instructions to the instructors giving the new course, "is to improve the cross-country ability of the student. There is a strong probability that the course will improve the student's air technique and demonstrate that he is more capable than under the present flight course to 'think ahead of his airplane.'"

It also suggests that the instructor "assume the position of salesman, counselor, and instructor" and reminds us that most plane users are interested in the airplane as transportation, not in becoming precision aerobatic pilots.

"Therefore, stalls, spins, maximum coordination exercises and the flying termed air technique must be judged as extremely important and necessary for safety but incidental to cross-country." It suggests the cross-country must be

made interesting, adding "this is less difficult to do than making air work interesting."

It suggests that the instructors in planning the course use airports of universal pattern—all-way fields, fields with paved runways, and one-way strips—and adds that the student should be taught how to taxi on different types of fields, where to taxi, and how to approach gas pits.

And the justification for this new curriculum? Here are the reasons as Brown outlines them:

1. It will be more interesting to the student. Statistics on G.I. flight training show that nearly 50 percent failed to complete the course, chiefly due to lack of interest.

2. Relaxation of the student.

3. The curriculum is specifically designed to train the student to do better the things that his certificate will give him a right to do—that is, carry passengers from one place to another.

4. It develops navigational habits and strange-field techniques.

5. It promotes safety by giving the student a wider experience in "away from the airport" flying.

6. It develops weather consciousness. It shows him the importance of a 180 degree turn, done at the proper time.

7. Since less solo time is spent on monotonous maneuvers and more in going places, it tends to reduce buzzing during the solo practice stage. Experience has proved that few students will deviate from a prescribed cross-country course, especially if they have an ETA to meet.

8. An examiner, during the flight test, will be able to evaluate not only the precision of the student in the maneuvers that he will do in his later flying, but also can determine his judgment and general flight characteristics.

9. The student gets a much better idea of the potentialities as well as the limitations of the modern personal aircraft.

SNOWFLAKE

(Continued from page 43)

the stack, and the reversal of the needle valve body and the rework of the fuel inlet pipe for right-angle feed to keep the fuel line within the fuselage.

The two salient construction features are the motor mounts and the wing fastening. Much has been suggested by motor manufacturers in the matter of flat, rigid mountings. Heretofore mountings have consisted mainly of hardwood stringers or crutches, all of which have proved hard to manage both in building and flying due to thin fuselage sections, extreme vibration, and the solvent qualities of present day racing fuels. Various plastics had been tried, but all had failed, due to fuel, brittleness, or lack of cementability. The idea of dural or magnesium had been toyed with previously but had been discarded due to expected difficulties of fastening.

With the advent of this ship, however,

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after building three previous Class VI ships this season with experimental features in them, it was decided to give dural a try. In this case the metal was procured from the back of a diamond-impregnated grinding wheel which had done its service in the shop. It was machined in a roughly rectangular shape and all the shoulders and radii milled, leaving the front ends connected until it was mounted in the ship and then trimmed off flush with the nose. This was done to preserve flatness. After mounting in the fuselage, a light cut was taken across the mounts to finally "true up" the whole works with the parting line of the fuselage.

The fuselage itself started from two pieces of close-grained sugar pine, 2½" x 1¼" x 24". These were fastened together with two corrugated box-fasteners. Not having any wood-working machinery, the venerable draw knife was brought into play and the block roughed down to about a 2⅜" cylinder. Then the blocks were separated and center lines drawn down the inner surfaces and the best of the two selected for the bottom. A jury-rigged Moto-Tool router was used to mill a step the depth of the side mount-members. The mount was laid on this step inverted and the inner shape scribed to show working and hollowed areas. The hollowed areas were roughly sunk to give clearance and the working areas were cut to a glove fit around the mount cross members. Two very small wood screws were used through the cross member tap-drill holes to hold the mount in place during construction. The two blocks were fastened together at the front end with tape and the entire fuselage tapered to finish size and shape externally.

The bottom half of the fuselage was practically finish-sanded and given a light coat of sanding sealer to harden it. It was drilled for the mount-fastening bolts from the inside, using the tap-drill holes at the mount cross member for drill bushings and then enlarged from the outside to take 6-32 screws. The inside was hollowed out to accommodate the components and provide clearance and lightness.

The top half of the fuselage was laid out for the diameter of the engine barrel and drilled and filed for a bush fit down to the stack. Corners were squared to clear the shortened stack and interference points began to show up around the timer and carburetor. These were cut away as they showed up, to allow the front sections to be left as thick as possible for strength and rigidity. After the two halves could be brought completely together the top outline of the greenhouse was transferred to the upper half by pencil. A ½" balsa plank was hollowed out to fit down over the head, leaving about 1/32" on top and a hole gouged to clear the spark plug. A large block of soft balsa was cemented to the front of this piece and hollowed to fit around the cylinder barrel and was cut away on the bottom until it fitted the front portion of the fuselage perfectly and cleared the head fins by about 1/32". Then 1/16" hard balsa planking was cemented to the rear portion of the solid

block and roughly trimmed to fit the fuselage.

With a pencil compass the exact shape of the bottom edge was transferred or "spiled" onto the sides so that when trimmed it would allow the entire assembly to clear the head by 1/32". The inner edges were beveled and the whole thing was scrunched down until the top just rested on the head. This made the lower sides bend out and thereby secure a closer fit-up. It was taped on, and glue was run into the inside joint line with the old faithful loop of wire. The exhaust opening was cut and trimmed to clear the stack, the front block was thinned down inside and faired true and smooth outside, and the entire greenhouse radiused off. A 1/8" x 1" slot was cut for air and wedged out internally and a scrap balsa bubble for the plug put on.

The wing spar was a piece of basswood 3/8" x 3/8" x 21½" tapered to 1/8" at the tips. A full scale layout was made for the ribs and wing outline, using the lower half of the fuselage to scribe in the outline of the body.

The #1 ribs were placed so that they just touched the outline of the fuselage and the others spaced off. Mahogany plywood 1/8" thick was used for ribs. These were made to full outline. Pairs were matched and tack-glued and filed so they faired up well when stacked. They were laid out on the drawing and the spar pressed over them and notch lines drawn on them, then were cut and separated and glued in position. After gluing, the tips were cut off for the leading edge strips and the holes drilled for control wire tubes in the left wing.

You will no doubt ask, "Why a counter-clockwise circle with bad torque effects and an inset rudder, which all go to make a mean handling plane?" Every take off with this ship has had all the ground out-pull and smooth handling on the way up that could be asked for. There was a period this season when a lot of trouble was had with cradle type dollies, but a spike and fork type was finally worked out that did the trick.

The upper half of the fuselage was marked off for the spar slot and cut to depth. A recess was hollowed to clear the bell-crank bolthead and the spar glued in place. When the inside was hollowed out, a shoulder was left both fore and aft so the spar was supported on three sides.

Small pieces of balsa were used to plug the notches in the sides. Leading edges were glued on rib ends and the fuselage, leaving about 1/16" above and below to cap the planking. Planking consisted of 8 pieces of 1/16" x 3" hard balsa. Bottom planking was put on first and then the top. Care should be taken to see that the planks meet the fuselage squarely and are pinned down tight to the ribs when gluing. The left wing cap can be fitted before the top planks are put on and the right cap can be cut and slid into the wing.

Tail assembly was made of 3/32" mahogany plywood. Leading and trailing edges were brought to a knife-edge. Rudder was installed with about 1/8" offset to turn the plane into the circle. Care should be taken when fitting the control horn and push-rod to see that holes are drilled to absolute minimum size. Otherwise, by the time the ship is flown, the feather edges will have worn down and sloppy controls will result. The bell crank was cut so there was about 1/8" up-throw and 1/16" down-throw with full crank movement. Wire of .040" dia. was used for the pushrod and .024" for wing lead-outs. It was planned to bring the control lines directly to the bell crank but this idea was discarded because of the bulk and bother of trying to manage a cable reel fastened to the wing while in transit.

Fuel tank was made from .005" shim brass. A Gits snap-cap was used for a filler and 1/8" brass tube for lead-out pipe. Intake end should be tack-soldered to the side of the tank to prevent flutter and frothing of the fuel. To reverse the carburetor on the Dooling, it was necessary to file the inlet side back to the hex body and use a piece of 1/8" brass tubing. A tiny bit of 12 gage copper wire was filed square on the end and inserted in the tube, a narrow jeweler's file used to cut a notch in the tube and then, with a pin, the notch was opened out until it was the same area as the hole in the carburetor body. The whole works was tinned and then sweated together. The needle valve handle was cut off and an extension soldered on.

A bicycle spoke was used for the front fastening, running up through a brass tube soldered into the tank. The dolly spike hole was drilled so as to come up through the pine bulkhead left between engine pit and fuel cavity. This bulkhead serves to keep slop from the tank running down around the mounts and softening the wood. It also serves to strengthen the area around the mounts.

The driving assembly was modified slightly from the stock Dooling type. The aluminum driveshaft that fits on the crankshaft was shortened to just under the thickness of the prop used. A 3/16" x 1/4" aluminum hex adapter was cut down slightly and about 1/8" cut off the 3/16" crankshaft stud. The stock Froom spinner cap-nut was cut back also, so that when all was assembled and drawn up tight, nothing would bind.

Holes were drilled in the spinner backplate to take the driving lugs and a 3/8" washer was centered over the prop hole to provide a firm bearing for the hex nut to pull against.

Much was written and discussed last season about prop requirements. Articles advocating pitches up to as much as 18 to 20 inches appeared. A 9" x 9" dark wood Super-Scru was used on this ship, utilizing entire blade area and modifying the airfoil slightly. We had heard early in the season about the tremendous speeds turned with 9-pitch props and couldn't quite believe it in view of our experience with racing outboards with approximately 60 to 70 percent prop efficiency. However, one day it dawned that air, being a more fluid medium, could supply lift whereas a water prop relied on ram thrust only. Lo and behold—the why of 130+ speeds with lower pitched

blades! As with any high speed machine, the prop must be in perfect balance in order to allow maximum thinness without shattering. A ⅜" diameter arbor-hardened preferably, and a pair of leveled knife-edges can be brought to good use with the half round bastard file and the sandpaper block.

One thing might be said concerning prop diameters. You have seen Class VI jobs with 10" and 11" clubs, and right next to them you have seen the same engines with 7½" x 8" toothpicks. A diameter should be selected that—depending on the rpm of the ship—will be just below the shattering point when the engine is in a fast four-cycle. Any further reduction in diameter will reduce the tip speed to a point where the prop airfoil cannot work efficiently. After diameter is established, the blade area should be jockeyed until the motor, when peaked out in the air, develops its maximum rpm and power. If you can get the rpm into the right size blade, you can't help but travel at a rapid rate! Two different props have been used on this ship, both of identical pitch and diameter but differing by slightly over 1/16" in width and the speed went from 128.5 to 143.82 mph! The type of day, the fuel, and all else were identical, so the only difference was the blade change.

This ship was finished off with several coats of good sanding sealer after the rough spots around the cowling had been smoothed up with lacquer glaze. Plenty of elbow grease is needed between coats, and after a final dusting off with #400 paper, one thin coat of white Nu-Enamel finished it.

The dolly wheels are 3½" on the front and 3" on the back. It was adjusted to give a perfectly straight roll with the ship on it. You will find that with a fairly short wheel base and the front wheels well out ahead of the wing, the more pull on the lines at take off, the more out-pull you will have. It will seem strange to pull to make the ship go outwards, and slack up to let it roll toward you, but it works fine. The spike hole should be small enough so that several good shakes are necessary to drop the dolly off. Then when the ship takes to the air, the motor vibration will shake it off with no perceptible lag and yet it will be on tight enough on the ground to steady the ship against torque.

Needless to say, an electric starter is a necessity with high spark settings and thin props. Batteries should be fresh each session. One of the most common sources of trouble at meets seems to be ignition—either dead batteries or bad wiring. All wiring should be done with at least 20 and preferably 18 gage *flexible* wire and all joints soldered. Where splices are made, pieces of lucite tubing may be slipped over as sleeves. Enough slack should be left for the wiring to flex, but not enough to slap around inside. A length of neophrene fuel line slipped over the spark-plug lead will help guard against burn-throughs. No switch is used on this ship as the slide type fails rapidly under vibration and oil, and the toggle type is too bulky and heavy.

REPORT FROM WASHINGTON

(Continued from page 68)

AMA Contest Board has been altered. Heretofore, members have been appointed to the Board. However, it was felt by many that by electing members of the Contest Board it might be possible to obtain the services of a more representative group for each of the districts. Accordingly, the following individuals have been elected to serve on the AMA Contest Board for 1948: District I——Bernard Collins, Providence, Rhode Island, and Carl Hermes, Bridgeport, Connecticut; District II——Harold G. Bradish, Schenectady, New York, and William Fletcher, Elmhurst, L.I.; District III——Carl Hopkins, Clarksburg, West Virginia, and Chester Lanzo, Cleveland, Ohio; District IV——Dr. Walter A. Good, Silver Spring, Maryland (Chairman), and John Worth, Hampton, Virginia; District V——C. C. Caviness, Atlanta, Georgia, and C. H. Thornton, Jacksonville, Florida; District VI——Carl Goldberg, Chicago, Illinois, and Al Yount, St. Louis, Missouri; District VII——Frank Sposite, Detroit, Michigan, and Curtis Janke, Sheboygan, Wisconsin; District VIII——John Clemens, Dallas, Texas, and Rogers Barton, College Station, Texas; District IX——C. L. Bristol, Cheyenne, Wyoming, and James McClelland, Wichita, Kansas; District X——Jack Douglas, Salt Lake City, Utah, and Harvey Robbers, Sr., Oakland, California; District XI——Elmer Roth, Salem, Oregon, and E. R. Nichol, Portland, Oregon.

Shortly after the election, the comment was received at Headquarters that it would be virtually impossible to elect a district representative to AMA office unless that individual were named on the ballot by the Nominating Committee. In reply to this, it is interesting to note that in the above list of elected officers, seven individuals in four districts were elected to office although their names did not appear on the ballot. It looks as though this might be another good reason to set up local, state and district model organizations.

F.A.I. International Model Committee. In view of some of the recent discussions among model builders in this country and especially those by the AMA Contest Board in connection with the rule changes for 1948, some of the matters discussed at a meeting of the C.I.M.R. (International Model Commission) held in Switzerland last September are of particular importance. Inasmuch as the AMA Contest Board has recently created a new classification for jet-powered control-line models it is interesting to note that the question of jet propulsion for model aircraft was thoroughly discussed by this international body. It was decided that, for the present, no international class would be created for jet-powered models. The committee decided that it would be wise to wait until further development

and experience could be obtained.

It should be pointed out, however, that the discussion was concerned only with the use of jet engines in free flight models. We assume this to be true, for although the minutes did not so state, they did point out that during another discussion on the recognition of control-line models the committee went on record as believing that control-line models had "little to do" with model flying.

Because of the fact that interest in control-line flying in the United States had progressed so rapidly in a relatively short time, it appears that no one has as yet planted the seed of control-line interest overseas.

Just so that you won't think that we are picking on control-liners and jet enthusiasts exclusively, we hasten to add that during the discussion of indoor models at the Geneva meeting, it was recorded that in the case of microfilm models, this class of model aircraft was not as yet well developed and that (on the Continent) it did not appear at the present to be a subject of sufficient interest to require further discussion. As a result, the question of rules for this classification was abandoned for the time being.

Point System for National Champ. During the last open Contest Board meeting in Minneapolis, an extremely interesting discussion was started from the floor by William Effinger, Jr. of Brooklyn, N.Y., who stated that he believed the present system under which the National Meet Champion is determined is inequitable. Pointing out that this system permits a large accumulation of points in one category, Mr. Effinger said he had given the problem a great deal of thought and inquired of Dr. Walter A. Good, Chairman of the meeting, whether the Contest Board might be interested in receiving his suggestions. Dr. Good advised him that the Board would be more than pleased to receive any suggestions he might care to submit. Mr. Effinger then proposed the following new system:

1. Do away with the single national championship and create, instead, a separate championship for Junior, Senior and Open classes. It is further suggested in this connection that the National Championship Trophy be automatically considered the Open classification championship trophy since, as pointed out by Mr. Effinger, it has been frequently won by a modeler in the Open classification.

2. Points should be awarded as follows: Major events, (those having over 50 contestants competing in event)—— first place, 100 points; second place, 95 points; third place, 90 points; and continuing with 5-point graduations down to twentieth place.

3. Secondary events (those having less than 50 contestants competing)——first place, 50 points; second place, 45 points; third place, 40 points; and so on to tenth place with 5-point graduations.

Mr. Effinger explained that the differentiation between "major events" and "secondary events," based on the number of contestants competing, is proposed because it is increasingly more difficult to

win an event as the number of entrants in that particular event goes up.

Apparently the plan is based on an attempt to name as National Champion a model flyer who entered and placed in a large number of events thus indicating his versatility and all-around ability in building and flying. By suggesting a graduation of 5 points for each place, an attempt is made to place emphasis on the ability to fly and place in a number of events instead of winning one or two events. It is felt that in many instances the difference between first and second place in free flight, for example, can be attributed largely to luck.

This suggestion is submitted for the consideration of all interested flyers and the AMA Contest Board would appreciate comments and further suggestions. Why not talk it over and drop a note either to your local Contest Board members or to Contest Board Chairman in care of AMA Headquarters.

High Cost of Living? With the steady increase in cost for everything from a telephone call to a sheet of paper, not to mention rent and printing, it becomes apparent that consideration must be given to the operating expenses of the Academy. With this in mind, a discussion was initiated on the floor at the 1947 annual meeting by "June" Pierce of St. Joseph, Missouri. It was Mr. Pierce's suggestion that consideration be given to raising AMA dues and possibly the establishment of graduated sanction fees. In the past, Academy officers have been reluctant to raise the annual license fees, because they did not feel that a license fee should become a financial barrier to any model flyer desiring to enter a sanctioned contest. However, after a thorough discussion on the floor, during which several suggestions were made as to the amount of increase which might be made, the members present voted in favor of giving the matter every consideration and possibly raising the annual rate of gas licenses and Leader member dues.

Subsequently another suggestion along the same lines was received at Headquarters from Harvey S. Robbers, Sr., of the Oakland, Calif., Cloud Dusters. It was Mr. Robbers' feeling that the present rate of license fees is not in line with present-day standards of costs, and to compensate for this condition he suggested that the annual rubber license fee be raised from 50¢ to $1.00, that gas powered licenses be raised from $1.00 to $2.00, that Scientific and Administrative Leader Member dues be raised from $3.00 to $5.00, that Industrial Leader Member dues be raised from $3.00 to $10.00, that Contest Directors' dues be established at $10.00 a year and that AMA chapter dues of $10.00 per year be set up.

It was Mr. Robbers' further thought that model clubs and other sponsors of contests would be willing to pay a reasonable sanction fee. It was also suggested that a graduated system of sanction fees be established, based on the size and importance of a contest and on whether or not it was sponsored by an AMA chartered chapter.

WHIP POWER THUNDERJET

(*Continued from page 63*)

line modeler who broke-in on the whip ships. For instance, Dave Slagle, winner of the National Stunt Championship and the Jim Walker Trophy at the last National Meet, learned control-line flying by first starting off with Whip Control.

Don't for a minute think that just because you haven't got an engine in the nose of the model making a lot of noise that Whip Control is sissie stuff. One thing that you'll have to remember is that you can't just stand around and watch the model fly. You are the fellow who's flying it and you must keep it flying. You can't even stop for a second and admire the beauty of your model. And you can't blame a crackup on the engine's conking out! If you try to climb into the wind and the model slips off on one wing and crashes, you are the one to blame. But once you get the hang of the "no power" technique, you may even find that you'll lose interest in powered jobs. You can fly without the worries of batteries, props, ignition, or any other of those headaches connected with power jobs. It's a lot cheaper, too!

The P-84 Thunderjet model is an example of how designs can be adapted for Whip Control flying. Note that certain requirements such as a long tail moment arm, and large stabilizer area are required for good flying qualities. Other factors such as a light wing loading (the weight of the model compared to the wing area), and smooth sleek finish contribute to good performance. Size, too, has a lot to do with performance. Generally speaking, most models should be kept to a size of under 20" wingspan. Models larger than this can be flown, however, but they will not have the maneuverability needed for spectacular stunting.

One thing for certain, if you can build a good hand-launched glider, you can build a Whip Control model. They are actually no more difficult. If you've always thought that control-line flying was difficult, or if you've always wanted to try it but didn't have an engine, why not build and fly this Whip Control Thunderjet? For an investment of not more than one dollar in materials at the local model shop plus what you can dig out of the scrap box you can have yourself a lot of fun and learn the fundamentals of control-line flying at the same time.

The plans for this Thunderjet illustrated here are full-size. Simply trace each part on to balsa wood; no re-drawing or enlarging is necessary. A good way to do this is to place a sheet of carbon paper over the wood, then put the section you wish to duplicate over it and then trace around its outline. Another method is to pin the desired section on to the balsa wood sheet and then pin-prick around the outline. Remove the plan and then cut around the pin-pricked borders along the wood.

Start off first with the fuselage which is cut from 3/16" sheet balsa. Pick fairly hard balsa so that it can stand the shock of a few hard crack-ups while you are learning the tricks of flying. Cut the body roughly to outline shape with a sharp knife and then smooth off any rough spots with fine sandpaper. Be careful when cutting out the notch (slot) where the wing slides through the fuselage to make certain that it is parallel to the setting of the stabilizer (front half of the elevator). Try to make this slot a tight fit so that the wing will not slide around when assembled in position. Add the 1/16" plywood wing mount and cement this piece securely. The bell crank is cut from 1/16" plywood to the exact size shown on the drawings. Punch the holes required with a sharp pointed ice pick, and then mount in the slot below the wing mount. An ordinary one-inch brad pushed through the bottom of the fuselage serves as a pivot for the plywood bell crank.

Cut both the wing and tail surfaces from fairly soft light 1/8" balsa sheet. Sand all surfaces to a streamlined section. If 4" width wood is not available at your local dealer you can join two 2" widths together to make the wing. The center section of the wing where it rests over the wing mount should not be sanded as it would tend to make the wing fit loosely in the slot.

Now add the elevators to the stabilizer by cutting eight cloth hinges 1/8" wide by 5/8" long and cementing them in position (see sketch). After the cement is set fold each one past edge of the stabilizer, place elevator in position and cement hinges to same. Don't get cement on the bending portion of the hinges as it will cause stiff control action. Cement the complete unit to the rear of the fuselage and observe it, while drying, to see that it lines up correctly with the wing and fuselage.

Cut the small metal fittings, wing line guide, and tail control horn from scrap tin (the top of a tin vegetable can serves nicely). Bend to the shape shown by the small sketches and plan. Attach the wing line guide on the bottom of the left wing half and use plenty of cement to hold in position.

Bind together the two sections of the push rod with thread. Do not cement, since this must be a sliding joint for further adjustment. Hook push rod into the elevator (control) horn and into bell crank. Pull pivot pin out, place bell crank in fuselage slot and replace pin or brad. Adjust length of push rod so the elevator will only be slightly down when the bell crank is neutral.

You are now ready for the hook-up, which requires only the following material: a fishing rod, bamboo pole, or other stick as shown in the sketch. A spool of cotton or linen thread as smooth as possible yet strong enough to stand a pull of at least 2½ pounds (quilting thread, No. 24 cotton). Do not use nylon, rayon, or silk thread, since this type stretches too easily and results in spongy action of controls. For high speed flights use light linen or silk fishline (6 to 12 pound test)

or .009 to .013 music wire (No. 00 to No. 4). Lines should be approximately 25' long for training flights, and up to 40' long for stunt flying. Try different lengths, since the best operation will vary with whip action and characteristics of the plane itself.

Thread lines through holes in control handle and tie to adjusting knobs. Thread other end of lines through guides on whip, then through line guide on wing and tie to bell crank. Lines should be adjusted to proper length by winding around knobs of control handle. The push rod should be set (during training flights) so that full down on the control handle will fly the plane level or in a very slight downward angle. This simplifies training since it prevents sharp dives and erratic control.

Modeling clay must be added to the nose of the model to properly locate the C.G. (center of gravity). Pack clay around the nose until the model balances about ½" ahead of the bell crank pivot point. Be sure to check after each flight to make certain that no part of the clay has fallen off.

*Flying Instructions**

Initial Flight: Now with lines free from twist and adjusted evenly, have an assistant launch plane. Immediately swing whip forward and continue to turn with right arm outstretched. Watch attitude (not altitude) of plane and correct by moving control handle. After a few flights the feel of control will become automatic and you can do fast climbs and dives with ease. The faster you whirl the faster the plane will travel. (Always make climbs downwind, and dives against the wind. Any sharp climb against the wind will cause the plane to be blown in toward you with consequent loss of tension on the lines. If this does happen, swing whip quickly ahead of plane and pull back on control lines with control handle in full down position. This will tighten lines and cause plane to speed up and fly out).

Landing: When bringing your plane in for a landing, slow it down, but do not pull up on elevator until just before it touches the ground. In other words, be sure to maintain flying speed until just before contact with the ground, otherwise plane will stall and drop down sharply.

Flight Trim: The rudder and wing should be without offset or warp; however, it may be necessary to trim surfaces due to slight longitudinal warp of fuselage or unequal lifting properties of wing. If your plane feels like it is flying out too strongly, bend rudder gently to left while breathing on it. Also twist right wing for more wash in. Reverse this procedure if plane has tendency to fly inward.

Casting Launch: By doubling up the strings and holding two long loops, one in the left hand and one in the right, you can launch plane yourself. Before starting this type of launching be sure elevators are in neutral position. With plane held

Courtesy American Junior Aircraft Co., Portland, Ore.

above the ground, whirl around; cast plane slightly upward and release lines simultaneously. Do not try to pay out line slowly, since this invariably changes elevator setting, which will cause either a sharp dive or zoom.

Whip Landing: You can stop your flight without having plane touch the ground by proceeding as follows: With plane flying around slowly in level flight, pull control lines back with left hand as far as possible, then squeeze control lines with thumb and forefinger of right hand, all the while keeping plane in the air by turning around. Reach up with left hand, grasp control lines and again pull back with left hand. Repeat this until you have lines short enough to prevent the plane touching the ground when the end of the whip is held high. This procedure of course is just the reverse of the casting launch as described above.

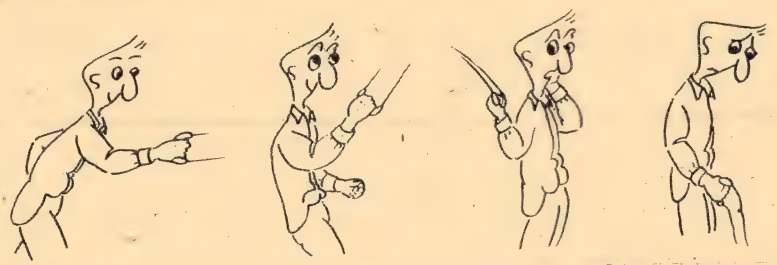
Winding Lines: After flying your plane you can wind the control lines around the control handle and secure them by means of a half hitch around one of the adjusting knobs. This obviates disconnecting lines after each flight.

Control Line Maintenance: If you are using thread or cotton fishline, you will find it necessary to replace lines occasionally, since they will become fuzzy and frayed due to action through the guides and wind resistance. When they get in this condition they are liable to cause poor control due to binding against each other. Before each flight check controls for freedom of action.

Loops: With push rod set in stunt position, whip plane around until you have it at almost top speed and about 10 feet from the ground. Pull up on control handle gently until plane is almost on its back, then snap to full up position. Plane will then complete its loop high. Do not pull back sharply at start of loop. This will cause a high speed stall that destroys lifting action and causes plane to mush through the loop. During the loop the pole should be continuously rotated in the same path as the plane in order to maintain its flying speed. After a little practice you can make loops without any motion of the whip during the loop. Always start loop with wind at your back. In other words, loops should take place downwind from you. The best loops will be made when the plane is started on its upward path just as it comes into the wind. This not only gives added lift at the start of the loop, but also tends to maintain tension on the control line at all times. Loops can be made with push rod in training position; however, they will be much larger in diameter and require a higher start.

Consecutive Loops: You can make consecutive loops in two different ways. First, go into a loop in the normal manner and swing the whip around ahead of the plane in the general path of the loop. The plane will continue to loop as long as you swing the whip, except that you must make corrections for gradual loss of altitude. This is done by easing off on the up control as the plane starts into each loop. This will cause the plane to climb high and complete its loop higher than the start. The second way to make consecutive loops: At the start of each loop pull control lines sharply to decrease radius of circle. This gives an added impetus that will speed up plane enough to carry it over into a loop. (Caution: After a number of loops have been made, be sure to untwist lines, since any binding action will cause frozen controls.)

Fixed Position Flying: After you have become proficient in piloting as described above, you will find it easy to fly your Whip-Power plane without turning around. This is done by flying in the regular manner at a fixed altitude, and then stop turning but keep the pole rotating over the head, swinging it around similar to the action of a lasso. Hold a very light grip on the control stick so as to prevent any movement of it when the plane is behind your back. With a little practice you will find it easy to do almost as many stunts in this manner as you can by turning around.



Speed Flying: Whip held in left hand, control handle in right, with the heel of right hand pushing against whip. This arrangement gives maximum leverage for extreme high speed flights. *Footwork:* With a quick stepping action hop from one foot to the other and turn as fast as possible. *Computing Speed:* With control lines 28 feet 3 inches long (measured from middle of plane to control handle), time 8 laps with stop watch (altitude must not exceed 10 feet). Divide elapsed time into 1000 for speed in M.P.H. Example: 12.2 seconds for 8 laps. $1000 \div 12.2 = 82$ M.P.H.

Formation Flying: You can fly formation with as many as four pilots in the circle at the same time. All should stand with shoulders together and wheel around at the same speed. Various formations can be worked out and it is even possible with a little practice to rest one plane on top of another without disturbing the flight of either.

Aerial Combat or Dog Fights: With scotch tape, attach pieces of paper serpentine 6 feet long to planes. Take turns in zooming your plane up past the tail of your opponent's plane to cut serpentine. Winner can be determined by shortness

of serpentine left trailing, or number of attacks made before cutting same. With a little practice you will find it possible to cut serpentine so that it will drape over wing of attacking plane and can then be cut again by your opponent. This transfer can go on until only a short length of serpentine is left trailing.

Gliding: With lines at least 30 feet long, get your plane up as high as possible, and then suddenly stop motion of whip. As plane starts down, set control for flat glide, and then let lines go slack. The drag of the lines will cause plane to circle to the left, and you will find it possible to make as many as three complete circles without applying power. If circle is too large to keep lines slack, walk in circle, following it around. You will also find it possible to control the gliding angle of the plane even though lines are slack, if you have made your plane correctly so that control action works easily. This ability to control the plane with slack lines is due to the greater drag of the leading line.

Soaring: Stand on the edge of a bank or hill with the wind blowing up the slope. Bring your plane around slowly into the wind over the edge of the bank. You can hold it stationary in the air by watching its action. If it has a tendency to glide ahead, pull elevator up which will make it drift back. If it has a tendency to drift back, give it down elevator, which will again bring it into the rising air current. You will find it possible to hold your plane stationary for a long period of time, providing there is a strong up draft. (For this maneuver it is usually necessary to make a slight change in rudder setting, so that plane will hold itself out and maintain tension on control lines. It may also be necessary to warp left wing for more wash in.) With a little experimenting you can make your Whip-Power plane soar like a gull and hover like a hawk.

DOPE CAN

(*Continued from page 68*)

tifully, causing them to part usually one turn of the winder less than the total you'd figured the rubber would take.

Lo, the Poor Engine. Are you a gas bug? When you haul out your gas models, is there a layer of dust on the engines a half-inch thick? Remember, those little particles which can ruin rubber can also do a beautiful job inside a cylinder, and if allowed to grind away on inside surfaces will cause compression to fade away. If your engine has been stored without protection remove the spark plug, pour in a little straight gas, and with your finger over the exhaust port turn the crankshaft over a few times. Then turn the engine upside down and drain it well, protecting it by squirting in a few drops of gas-oil mixture and turning the shaft over until inner surfaces have a rust-resistant film on them.

Ask Mom the name of the "five-and-ten" where she got those transparent dish covers she uses when storing odds and ends in the refrigerator—don't swipe hers—and slide one over the engine. It's a good idea to get one for each engine you own, and use them at all times while the engines aren't in use, particularly if the flying field tends to be a little dusty.

Care and Operation of Engines. From observation, it appears that lots of modelers have the idea that the flying field is the proper place to check the engine, finding out after they get there that a connection should be soldered or some other such repair made which can only be done at home. Seems as if the thing to do, then, is to adopt the idea that the flying field is for *flying*. Watch the fellows who are consistently "in the money" when prizes are being given out; you'll find that when they flip the prop or jam the spinner against the starter, their engines *start*. Don't be satisfied just with checking the engine on the boosters at home; make sure that she'll run on the flight batteries too. 90 percent or more of engine troubles can be charged to faulty ignition, so make sure that connections are tight and that wires aren't oil-soaked. Use solder lugs at all screw connections.

On the Subject of Soldering. While on the subject of solder, it might be well to mention here that although acid as a flux makes a joint tight, extreme care must be exercised while using it. After soldering, remove all traces of acid with water or with a moist rag to prevent corrosion from eventually eating through the connections and ruining them. The best way to avoid corrosion is to use resin-core solder or non-corrosive paste and bar solder. The local hobby shop may have it; if not, try the hardware store—and get the best. Initial cost may be a little higher, but one bar will wire plenty of ships. Your correspondent is using solder obtained in 1939. Use pretinned lugs and wire; the latter should be of the stranded variety. Even when pretinned, surfaces to be joined should be gone over with fine sandpaper until they're clean and shiny. Then join the parts together firmly and heat them well, with the soldering iron under the joint wherever possible. Add just enough paste to the joint so that it "cooks" away, leaving the surface brilliantly clean, and touch the bar of solder to it. The joint should be sufficiently hot to permit the solder to flow into the open spaces in the joint for a substantial connection.

Use solder and paste sparingly. Big "gobs" of solder don't improve a connection that's bad to begin with. Wherever possible, cut down on the possibility of "shorts" by protecting connections with tape; or better, when soldering two wires together cut off a ¾" length of transparent fuel line and slide it over one of the wires before joining. After soldering, slide the sleeve over the connection for a "fuel-proof" insulator. Keep a sharp eye on connections subject to hard wear, such as that at the points. Multi-strand wire will take a lot more

bending than single strand, but after advancing and retarding the spark a number of times the small strands will start breaking one by one until the cross-section of the strands left will be insufficient to conduct the current.

Metal condensers which are grounded through a mounting lug and which have one stranded "pigtail" lead may be connected directly to the points, but because of the type of lug used on the end of the pigtail they are to be kept under constant inspection. Insulation covering the pigtail lead is stripped clean, and a regular terminal lug is soldered on, leaving a small bit of the bare wire unsupported. This fails in no time, practically speaking, leaving a blue cloud of harsh language in the air. Now if manufacturers would only use the "insulation-grip" type of lug everything would be copesthetic. Unless you just don't care, don't connect a condenser with a single-strand lead directly to the points or it will snap after the first few wiggles of the spark lever. If installed back of the firewall, however, you can forget about it provided it's mounted and connected well.

Ignition Checks. If your engine refuses to run on the boosters, something is radically wrong. When there is little or no spark, the entire ignition system should be gone over carefully. If she stutters or won't run at all when you switch over to the flight batteries, check them first. If pinlight or flashlight batteries are used in a battery box, make sure that they're firmly in place and lined up the same way in which the boosters are connected.

Control-liners should have no trouble with switches, since they're usually a closed, "bugproof" unit, but free flighters should assure themselves that flight timer points are making good contact. Sometimes ignition points are covered with oil, dust, or both. If the points are at fault it can be discovered easily. With the points open, lay the shank of a screw driver against the "hot" side—if your engine has the points enclosed in a housing, this would be the threaded stud to which the wire from the coil is connected. Then, with the switch on or the flight time points closed, touch the tip of the screw driver to the engine. A nice fat spark should result. Now pull the high tension lead off the spark plug, hold the tip about ⅛" away from the top of the plug, and flip the prop over smartly a few times. If the ignition points are in order, a spark will show up every time. If there's no spark at all, or if there's no spark with *every* flip, or if the spark is reddish in color, stick a bit of clean paper between the ignition points, close the points so that the paper touches both, and pull the paper out. It'll probably be oily, dirty, or both. Repeat the process, using a clean strip of paper each time, until the paper comes out clean. Then check the spark again and you'll notice a vast improvement.

Fatality from High Tension Wires. From Joseph Bligh of Atlantic City, New Jersey, comes an account of the tragic accident which took the life of a modeler.

Flying his control-line ship next to some high tension wires, the flyer brought the ship too close, the steel control-lines touched the wires and he was electrocuted. The grim lesson taught us here is self-evident, and should bring home to those of us who tend to be a little careless at times the importance of the pledge we made when applying for our AMA license that we would always fly our models safely.

For your own sake and for the sake of others about you, use common sense. There is no such thing as being too careful. We who know of the tremendous power, comparatively speaking, developed by gas engines often take it for granted that others not so familiar with them also know it. The average non-modeler, however, calls them "toy motors" and can't understand why contest directors act so mean, shooing him out of flight areas. One death or permanent injury is too many. Cooperate with contest officials by refusing to fly while spectators are on the field. Consider your own safety; don't run engines indoors without adequate ventilation. You can't smell carbon monoxide produced by a running engine, but its effect is deadly. When tempered with reason, model flying is as safe as any activity. The AMA came into being in 1934, because state laws were enacted banning the flying of gas models. The laws were repealed when flyers banded together, drew up a set of safety rules and pledged themselves to eliminate dangerous and indiscriminate flying. Whether state legislatures could be convinced again is doubtful.

How to Use Plexiglass. Trenton C. Fry has a flying field for a front yard. Lucky Mr. Fry lives beside one of Minnesota's many beautiful big lakes and of course is a hydro bug. Current project is a whopper: his letter tells us that the hull of the flying boat he's building is seven inches wide—that's what the man says—at the windshield, and therein lies his problem. With such a width, he wisely concludes that the windshield should be made part of the structure and has therefore chosen 1/16" plexiglass for it as well as for the cabin windows. The latter are easy to install, being flat. But forming the curved windshield throws him.

Plexiglass is a thermoplastic material. In other words, when heated it can be molded to shape and will stay in the new shape if held in position until cool. We suggest to Mr. Fry that a wooden form be carved, as high as the windshield is to be, but 1/8" narrower, to allow for the thickness of the plexiglass sheet on each side. Some harder wood than balsa is recommended, as balsa might crush out of shape. The finished form should be a duplicate of the inside dimensions and shape of the windshield. Then cut a piece of plexiglass of ample size, bend it while cold around the form as much as possible and hold it in position with strips of cloth bound tightly around the whole works—gauze roll bandage is ideal. Then take it into the kitchen and set the oven at about 200° to start with. A little

more heat may be required, but it's best to work up to it gradually, as too much heat will cause the sheet to blister. "Bake" it awhile, until the wrappings start to get loose; then remove it and tighten them again. Repeat until the whole inside surface of the plexiglass sheet bears firmly against the form. Set aside to cool, still tightly wrapped. When cool, remove the wrappings and trim to size. A final word of warning: make sure that wrappings are flat and even, or windshield will look like a corrugated roof.

Microfilm Dope. John F. Chambers, of Homewood, Ill., has fallen in love with indoor models. However, he realizes that although the experts make 'em look easy there's more to indoor building and flying than meets the eye. Hence, he asks for info on microfilm and how to apply it, as well as for dope on indoor props. Even with our meager knowledge of indoor lore, giving him what we know about it would take up more than our allotted space. Besides, Frank Zaic said it a lot better over ten years ago in his world-famous year books which, praise be, have recently been reprinted. Write Frank at Model Aeronautic Publications, 203 E. 15th St., New York 3, N.Y. for prices and stuff. As to the microfilm mixture, each modeler has his own pet concoction, ours being ⅓ oz. of castor oil to a pint of clear lacquer.

Inverted Flight. Earl Niemi wants to know how to find out whether or not an engine will "die" when a control-line stunt ship is maneuvered into inverted flight. He has a stunt fuel tank, but when he turns the fuselage over by hand the durned engine quits on him. We wonder if he made the same mistake a friend of ours made who had the same trouble. Seems as if said friend rolled the ship over, thereby pulling the fuel away from the outlet, instead of doing a half-loop with it, as the job would do in flight. Try the latter, Earl, and she'll probably continue to run, so long as the maneuver is made with a sweeping motion, as it would be in flight.

Free Flight Fields. "Why have a ten minute maximum flight time?" asks Darrell Ybarrondo of San Diego, California. After hearing about some of the fields the Southern California modelers have, we understand the reason for Brother Ybarrondo's query. In the East, free flighters are being squeezed out, here and there, by such silly things as real estate developments and other foolishness. We bummed a ride from Detroit to Minneapolis last summer in the luxurious Mercury of George Reich of Cleveland. George, Dick Korda and your humble servant stuck their heads out the windows and positively drooled at the gorgeous free flight sites in the prairies of Illinois. In such places a thermal flight doesn't necessarily mean a lost ship, while in the cluttered-up East a kid with only one ship and one engine to his name has to shoot the works and risk losing the ship, hoping that the job stays in sight long

enough for him to win. With last year's rules, the guy with the dough could lose one model after another and accumulate enough time to win.

According to the vote taken last November, most of the flyers throughout the country agree with Don Foote and his Gas Model Committee that competition should be more of a test of the skill of the flyers, and that a flight of over ten minutes is merely a matter of luck, depending as it does on the weather and on the timer's eyesight. They agree, too, with the Committee's observation that it's ungood on the nerves of contestants for them to fret and fidget when thermals show up, while all of the timers are tied up with long flights being made by other entrants. The Gas Model Committee really tied the lid on tight when it recommended that only one model be allowed per event. Wait'n'see—somebody's going to develop a dethermalizer that works effectively *every* time, but even if that happens, our hat's off to the modeler who can get three consecutive ten minute flights with the same heap.

Pusher Props. Dan McClain's troubles are over. After seeing Dan's plea for a source of supply for pusher props, Bob Spicker of Cincinnati writes to say that various sizes of the left-handers can be had by writing Carl Doll at the X-L Hobby Shop, McMillan and Fairview Sts., Cincinnati, Ohio. Thanks plenty, Bob.

Junior Motors Active Again. Wonder what's cooking at Junior Motors? From the home of the ol' reliable Browns comes a formal announcement by Ed Roberts that Benjamin E. Shereshaw and Charles E. Kinney are now part of the organization, for which hooray! This gives us the opportunity to furnish Junior Unsel the address. June's looking for a set of piston rings for a Brown he has, and according to the announcement the address is Junior Motors Co., 40th St. and Westminster Ave., Philadelphia 4.

MODEL MATTERS

(*Continued from page 52*)

Surprised? Then hold your hats on this one. The most popular control-line event ranks 20th on the list, in a tie with Towline, Junior (Class VI, Open, and Class IV-V, Senior, were tied at 13 each). The ten most popular events were, in order: Class A Gas, Open, 113; Class B Gas, Open, 108; Class C Gas, Open, 104; Stout Cabin, Open, 78; Mulvihill Stick, Open, 74; Class A, Gas, Senior, 69; Class C Gas, Senior, 61; Class B Gas, Senior, 60; Mulvihill Stick, Senior, 56; Indoor Glider, Open, 34. Among the more surprising odds and ends: Wakefield entries totaled 114, but only 26 actually flew in all three age groups, making this a major disappointment. Open class contestants far outnumbered the other classes, at 675 to 403 for senior and 136 for junior. Perhaps a significant straw in the wind, 453 entrants registered for control-line speed but only 99 got around to flying.

Embarrassing Questions. Does the poor showing of junior events at the Nationals indicate how tough the hobby is getting for youngsters? Or was it just because it is more difficult for juniors to get to the Nationals? If the latter, what can be done about giving them a break? Already revealed in meet after meet, the bulk of control-line speed entries quit without flying when they see the competition. Is speed becoming limited only to the moneyed expert? Are U-control meets hitting the skids? With the big C free flights holding their own in popularity with A and B, were we right in listening to critics who asked why bother with classes? And how about those arguments for banishing stick? The Mulvihill Stick, with 114 entrants as against 106 for Stout Cabin, was the most popular outdoor rubber event throughout the three age groups. And why did total attendance shrink to 802 after those monster prewar Nats? Especially since there are more contest-minded modelers than ever before?

An Oscar for Wichita. The benefits of good leadership in our hobby never were proved so pointedly as in the past few seasons in and around Wichita, Kansas. What has been happening in Kansas should be an eye-opener to the clubs and the trade alike. In April, 1944, when Al Hummel, of the East Side YMCA, and John L. Downing, hobby shop owner, had their idea for the Hy-Flyer program, modeling in their part of Kansas was about as dead as the proverbial door nail. Today there are 16 good, active Hy-Flyer clubs in the vicinity of Wichita, not counting five that had been organized and turned over to the Park Department, and two unaffiliated clubs. Think of it, 23 going clubs in the vicinity of one medium-sized city! In fact, the entire state of Kansas has got the urge, having eight times as many hobby shops as in 1944, and 40% more builders.

Model airplane activity is such an important part of the Wichita East Side YMCA program that a substantial percentage of the annual budget is set aside for this work. Realizing that dependable leaders are the key to success, a small fee is paid to each club sponsor to insure his interest in the work. Most of the clubs meet in schools, some on school time. The Board of Education has approved the program, and local school people have proved remarkably co-operative.

Hummel, executive secretary for the East Side "Y," feels that the same co-operation can be secured throughout the nation, if you have a definite program to present and if there is a need for such a program in the vicinity. In most cities such a need exists. Juvenile delinquency is a term many officials understand. In

Wichita school teachers have sponsored some of these clubs. A complete set of material is available to clubs, and the "Y" does everything possible to make their organization and operation a success. Award books are provided so that clubs can follow an advancement program for individual builders. A leader's manual is available to group sponsors.

Canadian "De Bolt" Nationals. It is the unofficial accounts, rather than the official propaganda, which furnishes most of the interesting background on contests. Browsing through *Burden's Hobby Highlights,* a lively sheet put out by Burden's Hobby Lobby, in Toronto, Canada (two shops in Toronto, others in Orillia, Oshawa, and London) we get the impression that the Canadian Nats worked out to be a case of Canada against Harold De Bolt. De Bolt escaped to the States with first in Class A, B, C, D, speed and in stunt. He favored an R. B. Special in a modified Dmeco Junior. To minimize frontal area he chopped off the fins on the sides of the cylinder for close cowling. The top of the plug was flush with the cowl and the mounting lugs flush with the outside of the fuselage. The tail was of butterfly design. Total weight was only 18 ounces. With a commercial X-Cell prop, says the Canadian editor, this job clocked 130 mph. He adds, "In our opinion, it is the first of the really high speed models to come. Who knows, you might hear of 200 mph this year." De Bolt's stunt win was with a special Drone .49 powered Super Bibe.

Ugh! A thought provoking incident occurred at the Canadian Nationals which emphasizes the increasing amounts of centrifugal force being exerted on super speed models. Reports the editor of *Hobby Highlights,* "We thought our past had caught up with us when a Mac 49 broke loose at 122 mph. The ship arced over the stadium, cleared the roof of the adjacent hockey arena, and finally bashed into the Royal Ontario Museum. Ugh!" Ugh, indeed. Fortunately, such incidents are very few and far between. The point is that it is possible to prevent such happenings. Which reminds us that at the "Yank Nationals" very few builders were overly concerned about taking flights after spectators who had been permitted to roam the area stepped on lines, often kinking them.

Detroit Balsa Bugs. When it comes to that good old ingenuity, the imaginative Balsa Bugs outfit has got many other clubs beaten hands down. Warren F. Jones, who pilots a wicked typewriter, tees off with this one. "What rules suggestions? Throw out all the rules, except the motor classes. We do it this way. The contestant may use any motor run he wishes, of from five to 20 seconds. This is then divided into the total flight time. We tried this ratio system in our three free-flight contests this summer and no one got hurt, lost an airplane, or had a bad time! We believe in building, flying, and having fun the way we want, and not being dictated to by old fashioned rules committees and contest directors. Why not give this new system a chance? When the leaders wake up to the fact

that the majority of builders are out to have a good time rather than to become scientists, we will be a lot better off." (While many important changes have been made in the rules, the mail is still full of last-minute comments.)

The Bugs are going for stunt in a big way—as is most of the rest of the country. Last November they held a stunt meet, which came off smoothly despite cold, rain, and "annoyed neighbors." But most of the would-be contestants packed up and went home when they saw the competition, leaving almost as many prizes as contestants. Personally, we think the boys quit a little too easy. Stunt certainly puts more emphasis on skill and practice, than does speed which also emphasizes trick fuels, engines and props. Are model builders too bashful to take the center of the circle if they can't put on a top-notch exhibition? That "annoyed neighbors" business isn't funny, fellows. If possible pick a more remote spot, or use mufflers, or do anything as a last resort. But don't battle the citizenry. You can't win. The average citizen carps about airplanes, big or little, that make noise. And he doesn't care if trailer trucks make twice as much noise. We don't want a law agin' it, do we?

Wanted: Active Blood. The Buffalo Aeronuts are one club smart enough to avoid the all-expert rut. With approximately 60 members specializing in all kinds of models, including radio control, the Aeronuts will welcome any new members who can turn out for meetings on the second and fourth Mondays of the month. This outfit is fortunate enough to have two 70-foot circles and a 120-acre field free of obstructions for free flight. There are plenty of old timers able and willing to make with the answers. Interested builders in the area should write Mr. Gerald Stacy, c/o N. Main Model Store, 3142 N. Main Street, Buffalo, N.Y.

Big News from Canada. The Royal Canadian Flying Clubs Association, has asked the assistance of all Canadian builders and clubs, to help form a sadly needed nationwide organization to coordinate and control model aeronautics north of the border. This may sound like Utopia but the RCFCA is not interested in running the show, but simply in assisting the formation of a truly Canada-wide model aircraft body which will be set-up, directed, and operated by the modelers themselves. It is planned that the 45 member clubs of the Association will offer assistance and co-operation to model clubs in their localities. This assistance will take the form of flying facilities, both winter and summer, and in some cases meeting and work room space. All model enthusiasts in the Dominion are asked to supply names and addresses of corresponding secretaries of local groups and clubs. This information should be sent to the Royal Canadian Flying Clubs Association, 309 Journal Building, Ottawa.

Long-Hair Club. Ever since Carl Goldberg raised the question some months back of how model building might contribute to real plane design, we have pondered the oddity that modelers are strangely indifferent to any connection between models and real aircraft. There is certainly a minimum of the engineering approach, or research of any description, to model design. Now comes the newly formed Tech Model Aircrafters, of the Massachusetts Institute of Technology, Cambridge, Massachusetts, who have set themselves a very ambitious research program. Some of the projects include: power effects on stability (and, brother, this could be revealing); gas model props; "channel-wing" design; up-to-date rubber-power data sheet; vee-tails; ignition systems; new hand-launched glider construction. Henry R. Jex, our correspondent, says his project, shared with two other members, is gas model props. They plan building a torque-thrust test stand, and will check on commercial as well as their own designs.

For an engineering-minded outfit, the Tech Model Aircrafters are a versatile bunch, showing a well balanced interest in free flight, U-control, indoor, rubber, and gliders. Like everyone else they have some thoughts on rules. Jex thinks that loadings, both wing and power, should go up. Cross section should be increased, rather than eliminated. Ships like Weathers' Pacificoaster in his opinion display smoothness and finesse, yet still snag an occasional thermal for a thrill. P.S.—a "channel-wing" airplane, if this bothered you, develops lift when at rest. We imagine that each wing panel is shaped like a U; one real experimental airplane has a prop revolving within each U. Let it go at that?

Hobby Bowl. Wichita, once the acknowledged airplane capitol of the nation, appears to be making a bid for the model title as well. Typical of the drive and ideas that spark the west-Kansas modeling boom, hobby shop owners Jake Winfrey and Jack Pierce constructed on the outskirts of the city a hobby center, aptly called the Hobby Bowl. A Quonset hut houses the model shop and a coffee and snack bar. Two of the three projected oiled- and rolled-circles are in operation, as is a race car track. This track will soon be equipped with electrical timing facilities. The Bowl gets its name from the fact that it lies about fifteen feet lower than the surrounding ground, effectively cutting off those Kansas zephyrs.

Club Briefs. On December 9, the Pensacola Prop Twisters held a meeting for the purpose of reorganizing. They meet at 7:30 on first and third Wednesdays, at the Chamber of Commerce Building. Write Jimmie Green, Secretary, 113 9th Street, E.P.H., Pensacola. . . . Hart Betts, 7 Fox Promenade, Aurora, Illinois, suggests that all clubs in northern Illinois, southern Wisconsin, and eastern Iowa, check with him to avoid conflicts in next season's contest dates. After last year's experience in that section, Betts has volunteered to lay out a schedule for 1948 in co-operation with clubs in the area. . . . Brooklyn Model Association, 1053 East 13th Street, Brooklyn, N.Y., is reorganizing. . . . From Bill Sweet, corresponding secretary for the Los Angeles Thermal Thumbers: Strictly a free flight club. Meets first and third Thursdays at

the K & B plant. Club is a wing of the Los Angeles Aero Modelers, which affords a good insurance policy at reasonable cost. All members belong to AMA. Sweet can be contacted at K & B Manufacturing Co., 6901 Eastern Avenue, Bell Gardens, California. . . . From the historian of the Lawrence (Massachusetts) Gas Model Club, news of the annual dinner meeting on February 23rd. Active intersectionally, the Lawrence group thinks they will be tough to beat in '48. . . . Those LA Thermal Thumbers made more news by holding their first anniversary party at the home of Clarence Searcy, CD. Thirty-two members with eighteen wives and sweethearts "added to the glamour of the party." Club also held full dress party on Halloween, had parties planned for Christmas and New Year's. After the Nats we know the "Thumbers" can fly. They also know how to relax. . . . Chicago Flying Gremlins, a U-control outfit, reorganized. Flies at Winnemac Park, 2200 W. Winnemac Avenue, on Sundays. Meets every other Wednesday at Green Briar Park Field House, 2650 W. Peterson Avenue, at 7:30. Contact George Chirigos, Secretary, 1425 W. Carmen Avenue, Chicago 40, Ill. . . . Kiwanis Aero Club, Doylestown, Pennsylvania, sparked a new organization of model plane, boat, race car clubs in Bucks County. With a total of 132 members, all clubs in this Bucks County Federation are permitted two representatives apiece. Trademark, the Winged Mercury.

Odd Events. In Los Angeles area, Class A free-flight jobs were allowed in 1947 to compete with Class B and C. Class B models competed against B and C ships, while Class C competed in its own class only. Idea was that little engines could tackle big ones if they felt like it, but not vice versa. At the 23rd Semi-Annual Free Flight Contest held in November, Class B was taken by an Arden. One builder, Les Kaskell, who had entered an A ship in all three classes, lost it on the first flight in A. Finding the ship later in the day, he took one flight in B and lost it again. Once again it was found, and Kaskell took one flight in C, this time losing the ship for good. . . . At the 4th Vallejo Model Meet, three new events: woman's event, best inside loop event, and an event for the most beautiful plane in flight. Sounds tough to judge. . . . In a late fall contest, the Valley Model Skyhawks, of Ontario, California, restricted anyone who had ever taken a first or second place in an open contest to an expert class. Trouble is, an expert class keeps growing, if first and second place winners are taken as a yardstick. Eventually we are all experts. . . . San Francisco Recreation Department puts out a little paper called the *Third Dimension*. Lists three age classifications for department contests: Micro division, 11 years or under; Junior, 12 to 16; and Senior, 16 or over. Contestants can enter as many models as desired. Models must have 30 square inches or less of wing area, be rubber-powered or gliders.

Personals. Dr. Nickolaus L. Engel-

hardt, Director of Air Age Education Research, New York, received the 1947 Brewer Trophy, awarded for outstanding contributions to aviation education. A special committee named by the National Aeronautic Association selected Dr. Engelhardt "for his active participation in the field of air age education for several years, building up valuable teaching aids, plus his 1947 development of "Flying Classrooms." . . . Ed Yulke is now Ed Yulke, Inc., 512 Fifth Avenue, New York, an organization formed to co-ordinate and execute programs for hobby advertising, promotion, and publicity. . . . Frank Greene is now co-owner with Bill Baker of California Model Company. Among first kits will be a line of rubber models; one a microfilm job for the beginner, with directions that include "basic course in indoor building and flying." . . . Lee Galloway, owner of *Model and Hobby News*, of Southern California, proves that ladies know this biz too. Galloway's House of Hobbies was scheduled to open at 328 E. Tujunga, Burbank, during December.

Ignition vs. Glow Plug. The big battle between the "Champ" Ignition, and the "Challenger" Glo Plug, still rages, with the tide going one way in some sections, and another way in other sections.

A few days ago we received a letter from an old friend in the East. He wrote that the Glo Plug was dead there; that it simply did not live up to expectations; that it was already an obsolete gadget! He said that the boys had gone back to ignition, and the engine manufacturers who were planning on ignition-less engines would fall on their respective faces! Brother, what a laugh!

Now, this friend of ours ought to know better. He has been a model builder and designer for years, and is a pretty big wheel in the industry. We feel that this opinion of his is based on snap judgment and not on scientific fact.

It is true that the Glo Plug by itself is not a "cure-all" in every case. The answer is in the correct fuel. Some engines will run fairly well using Glo Plug on gasoline and oil while others fail to start, especially in cold weather. Nearly all engines run from fair to good on alcohol base fuels, but when the right combination is found *all* engines run smoother, start easier, and run faster on Glo Plug than on ignition.

Records Fall at Long Beach. We wish our friend could have been with us at the AMA Record Trials, Sunday, December 21st, at Long Beach, Calif. Once again, practically everything in the book was broken except Class VI. The highlight of the day was when Keith Storey and Troy Burris, who flies Ed Sharp's all-metal jobs, tied in Class A at the phenomenal speed of 132.98. In the run-off Sharp topped 133 mph! Keith, using a Glo Plug, put his McCoy 49 job to a new Class B record of 135 mph and Sharp fell just short of the Class C record at 141 mph. Don Newberger, the Old Speed King, was having the miseries. Don is experimenting with some new designs not yet perfected but which definitely cannot be counted out.

We are indebted to Bill Sweet, that popular member of the K & B Torpedo Company, for the following information. Bill has been elected as Recording Secretary of the Association, and was a delegate at the last meeting in Fresno. Fourteen of an eligible twenty-four attended. The State is divided into four districts: No. 1—San Diego; No. 2—Los Angeles; No. 3—San Joaquin Valley; No. 4—San Francisco Bay Area North. Six delegates are eligible from each district. Election of officers produced the following results: Vernon Oldershaw, Bakersfield, President; Ocie Randall, Fresno, Vice-President and Contest Commissioner; Roy Mayes, Berkeley, Secretary-Treasurer; Bill Sweet, Bell Gardens, Corresponding Secretary.

Among the highlights of the meeting were the following decisions. All contests under the supervision of member clubs to be 100 percent AMA rules prevailing. Any contestant caught willfully cheating to be barred for not more than one year from all contests under CAMC. The judging body to be CAMC delegates from the district in which the alleged violation occurs. One thousand cards will be printed and issued to persons who can qualify as official timers, and these people will be used in all contests. U-Control rules came in for the most discussion, and were finally ironed out to everyone's satisfaction.

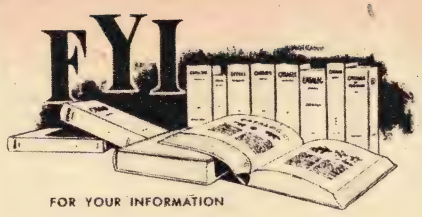
Any club in California may become a member by sending 50 cents to Roy Mayes, Secretary-Treasurer, CAMC, 1204 Delaware Avenue, Berkeley, California. Minutes of the meetings and a calendar of AMA sanctioned contests will be returned.

West Coast Shorts. The latest city reported to be interested in building an exclusive model recreation park is beautiful Santa Ana, Calif. Congrats to Santa Ana's forward-looking city fathers!

Model business, as reported by western dealers and jobbers, was 30 percent over 1946. 1948 is expected to be the biggest yet, in spite of the fact that many newcomers to the business folded up during 1947. All active west coast manufacturers announce plans for many new and sensational developments soon to be made public.

American Legion sponsorship, while slow to start in the West, will be much more active in 1948. There are no plans for the continuation of an Annual East-West Challenge meet. Ohlsson & Rice will continue to transport modelers to the Nationals in the company's big DC 3, but probably not on the same eligibility basis as last year.

Last month we were first with the news that the use of any of the Nitro-Parafin group of chemicals (Nitro-Ethane, Nitro-Methane, Nitro-Propane #1 and Nitro-Propane #2) can, under certain conditions, be extremely dangerous. This has been confirmed by the manufacturers, and again we warn: Do not use these compounds as a fuel. Tragic and fatal results may ensue. Not only injury to yourself and others, but to all model activity, may occur if this advice is disregarded.



FOR YOUR INFORMATION

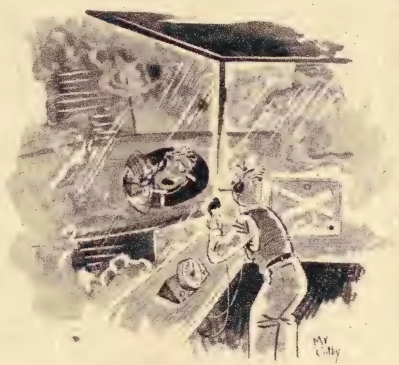
***Are you the type who likes to pore over catalogs, comparing specifications and prices? This section is for your information, then. Listed here are booklets, catalogs and other printed literature which may be of interest. Unless otherwise stated, material will be sent without charge upon direct request to the indicated address. Mention this column in your letter. Do not write to the offices of* Air Trails Pictorial.**

● Descriptive catalog of Aeronautical Training Division of Brayton Flying Service, Inc., available from school at Lambert-St. Louis Municipal Airport, St. Louis 21, Mo.

● Jim Walker's "How-U-Do" broadside gives detailed instructions and sketches for producing a super stunt Fireball. Also contains much valuable information on using rubber balloon fuel tanks, installing engines, constructing symmetrical airfoil wings, and mounting engines. Send self-addressed, stamped envelope with your request to American Junior Aircraft Co., 1166 N.E. 31st Ave., Portland 12, Ore.

● Soaring and sailing, fishing and flying is attractive deal offered by Embry Riddle School of Aviation, Miami 30, Fla. School booklet available to would-be aeronautical students.

● GMCO Hobbies' catalog and hobby tip book for model airplanes and race cars now contains data on props, construction, ignition hook-ups and the like. Twenty-five cent price includes regular supplementary catalog sheets mailed at no charge. From GMCO, 166-21 Jamaica Ave., Jamaica 3, N. Y.



"Well, *now* can you see me!"

AIR TRAILS

ADVERTISERS' INDEX

April 1948

While every precaution is taken to insure accuracy, we cannot guarantee against the possibility of an occasional change or omission in the preparation of this April, 1948, index.

R.C. Stuff

Sirs: Here is a message to all model builders who have high expectations for the new Citizens Radio Service band as a means of a license-free band for radio control use.

First of all, the new Citizens Radio Service band will not be entirely license-free. This statement probably comes as a surprise to a lot of people who have the impression that it was to be entirely free of all restrictions and licenses. Secondly, a word about present frequency allocations and the equipment designed for use in these bands. The two most commonly used bands are the 6 and 2 meter "ham" bands. These cover the frequencies of 50-54 megacycles and 144-148 megacycles respectively. To legally operate a transmitter in these bands requires an amateur radio operator's license. This is a Federal Communications Commission ruling and there are no exceptions. The majority of equipment manufactured and used, operates under the above requirements and it has won many contests and has proved to work out very well.

But here comes the long awaited news of a license-free band for radio control, —everybody will use it and it in turn will be used for everything. It's too bad it won't be "just what the doctor ordered." Let's find out why. To begin with, the Citizens Radio Service band covers 460-470 megacycles. This comes under the category of UHF or ultra high frequencies. It is up to nine times higher than certain FM or television frequencies and much higher than the highest frequency used by the airlines. It is even higher than certain radar frequencies. It is true that "lipstick" type transmitters and super-small receivers have been built but they are only laboratory "samples." As yet there is no manufacturer ready to put on the market a working unit operating in this new band. The FCC restrictions and specifications for these units are strict and much engineering and research must be carried on before anything is available.

The receiver to be used in a model may weigh more than the average in use today. The transmitter may be about the same or slightly larger. It must conform to certain FCC requirements and will be sealed. Only tubes and batteries may be changed. No one may use a transmitter unless it is one that has been manufactured by a company having an FCC approval number. Receivers and other control equipment may be made by the individual, but due to the nature of the frequency and type circuits deemed necessary, even the receiver may have to be purchased from a manufacturer.

It all boils down to the fact that as yet there is nothing ready or approved by the FCC to operate in the Citizens band.

EDWARD J. LORENZ

Kingston, N. Y.

He Wuz There!

Sirs: On pages 18 and 19 of the January *Air Trails Pictorial,* there is a picture of a B-29 forced down at sea.

This plane was one on which I was bombardier-navigator. The plane was part of the 40th Bomb. Squadron, 6th Bomb. Group, 313th Wing, based on Tinian in the Marianas. We had finished the second raid over Tokyo in two days, and on this particular raid, May 25, 1945, my plane was hit by flak over Tokyo. One engine was partially shot away and the oil system in another so damaged that it would not give much power. The raid was at 5000 feet over Tokyo and after leaving Japan we headed back. Having one feathered engine and one giving only partial power, it was necessary to make the two effective engines do more work, thus consuming more gasoline.

We found out we could not make it back to Tinian, so we decided to land at Iwo Jima (where the picture was taken). However, Iwo Jima was socked in as usual and the ceiling was about fifty feet. Iwo Jima was midway between the Marianas and Japan, or about 700 miles south of Japan. After Iwo was taken, it was a great comfort to B-29 fliers knowing they could land there. In this particular case, we radioed the tower on Iwo asking for permission to land. The tower replied that several other B-29s were trying to land with battle damage and wounded aboard, and we were not to land.

Because the island was socked, the tower was trying to talk them in by GCA (which I believe was the first use of GCA) but it proved useless. So the other planes had their crew bail out over the island, which we saw. We decided to bail out but when we did not count the usual number of parachutes opening, we decided to ditch the plane.

My pilot, a chap about 5' 6", brought the plane in for a beautiful landing, parallel to the shore, and a few miles off shore. The only damage sustained in the landing was from the rear bomb bay doors bursting open from the impact, and water rushing in through them to the tail. The five or six crew members in their ditching position in the tail were washed back and forth by the water, causing many cuts and bruises. One man lost his ear on a piece of metal sticking out. We in the forward section suffered only minor cuts and bruises. We were picked up shortly by Marines from the island and a naval detachment.

How do I know it was my plane? By the R with the circle around it on the tail, which is visible in the picture, as it was the Group insignia, and our plane was the only plane to ditch from the Group.

BRUCE T. McCOUN

Harrisburg, Pa.

THE LAST WORD

Last Month: In this column we spoke of our aviation writing friend, John F. Mason, and called him "James. F." James, of course, is the well known English actor. Reason was they're both so handsome! Busy bees have had nothing on the editors. Al Lewis put in an appearance at the Mid-States Model Aeronautical Association's third annual convention at Kansas City, Mo. (For his troubles with snow-struck airlines schedules, the MSMAA gave him an illuminated bow tie.) Alex Dawydoff was smarter—he went to Florida to attend the Southeastern States Soaring Meet.

* * *

This Month: How do you like those full-size blueprint model plans, men? And that Tinsley cutaway drawing? Mmm-m-m-m?

* * *

Next Month: Here we go again with the mosta of the besta. "Your Job in the New Air Force" by C. B. Colby; "Upstart," a Class C control-line stunt plane by Iowa's Claude McCullough; a super "Air Progess" feature by Doug Rolfe on the development of Martin planes; the Bristol Bullet Scout Type D World War II bipe as a rubber powered scale job; "Man Makes the Weather" tells you how scientists are seeding clouds for any type of weather you want; for CO_2 engine fans we have a scale flying model of the oldie-but-goodie Curtiss Wright Pusher; "Air Preparedness in the North" is the subject of our Tinsley full color cover and an extremely important article; something that is delicious: the "Multi-Moe," a combination low-wing control-line speed trainer and biplane free flight model powered by a Glo-plug Bantam; gorgeous Kodachrome shots each *three pages wide* of the new Seibel helicopter and the Stinson L-15 observation plane; Plecan plans for a control-line model of the same L-15.

There's more besides that, but we're afraid if we continue you won't be able to wait. Better set up a camp stool at your favorite newsstand or send in that subscription right now!

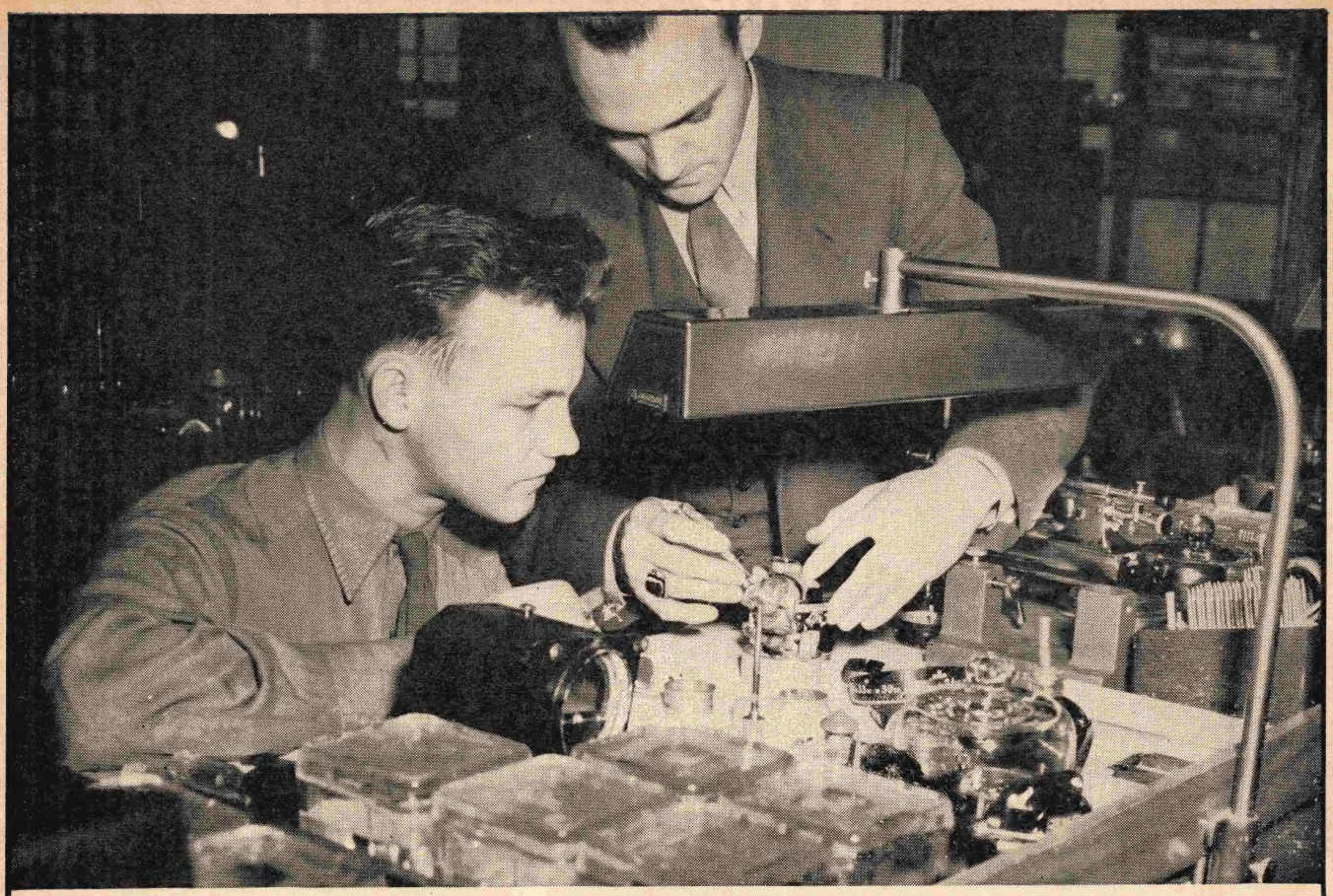
* * *

Calling all Eight-Ballers: All members of the Flying Eight-Ball Club who have received their credentials from Al Lewis or Russ Nichols are requested to drop a postcard to this column, care of *Air Trails,* giving their latest addresses. A membership roster is being compiled and club members know what that means: free meals!

* * *

This 'n' That: Did you notice that our story by Slick Goodlin, "Twenty Seconds in Eternity," was reprinted in the *Reader's Digest?* Showing the R.D. eds know a good yarn when they see it.

—The Editors.



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Flash! . . . NEW IMPROVED OHLSSON & RICE GLOW PLUG 85c . . . NOW AT YOUR DEALER'S

Ohlsson & Rice

Are Producing Two New Model Engine Fuels

Why? All the years that we have been manufacturing model engines, Ohlsson & Rice have never recommended any engine fuel other than 3 parts gasoline and 1 part SAE 70 lubricating oil.

We were, of course, aware that many gas modelers were using the so-called "hot" prepared fuels. *Gas models are flown for fun, and the more power the more fun, thrills, and performance.*

However it is common knowledge among engine manufacturers that these "hot" fuels as a class have been the major cause of all model engine troubles.

The reason is simple: Operating engines at high R.P.M. day in and day out requires high quality expensive lubricants which were simply not included in the average prepared fuel.

In a nutshell, the situation was this: Ohlsson & Rice engines, and other good engines, were capable of giving gas modelers consistent high speed performance. But the engine manufacturers' efforts were constantly being defeated, and the engines gummed up and otherwise damaged by inferior fuels. Producing in small quantities, the makers of these fuels were unable to use high grade materials and sell their fuels at a price which the average modeler could afford to pay

WITH THE APPEARANCE OF THE GLOW-PLUG several months ago, it seemed for a time that perhaps the answer to dependable high speeds had been found: that the problem was not fuel, but ignition. However, whatever additional work may remain to be done on the glow-plug, it soon became apparent that here too *fuels* were falling down—that the glow-plug alone was not the answer

For these obvious reasons—in order to protect our engines and give gas modelers the performance they were entitled to, this company—as the world's largest model engine manufacturer—has for some time been studying high performance fuels and in particular high performance lubricants for two-cycle engines.

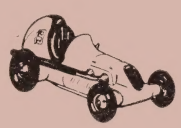
In carrying out the research, one of our first steps was to hire a competent chemical engineer to investigate all possible materials and develop fuels that would embody the latest findings of science.

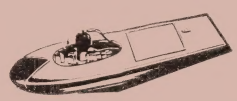
NOW AFTER MONTHS OF WORK and the construction of a complete fuel processing plant, Ohlsson & Rice Fuel Laboratories is prepared to supply modelers not just one but two superior gas engine fuels—"supreme fuels for model engines." As a result of tests with *every type* of engine, both standard ignition and glow-plug, contest and pleasure, we are in a position to change our long-standing recommendation and invite gas modelers to try really "hot" model fuels.

In every way, Ohlsson & Rice fuel No. 1 and No. 2 are *hot*, hotter than any formula ever before offered to model builders! Together with superior combustion and power-producing characteristics, they also contain the most expensive lubricants ever used in such fuels.

So complete is the combustion and so clean-burning are these two fuels that they not only do not form carbon, sludge, and engine varnish, as do other fuels, but they actually remove and expel carbon, sludge and varnish that previously had been deposited.

LAST AND NOT LEAST, in spite of our sizable investment and the exceptionally high cost of the materials used, these fuels are offered at *competitive* prices, in line with Ohlsson & Rice's long-established policy of setting the "standard of the model world." Both fuels are available at your dealer's for immediate delivery





PINTS 75c
QUARTS $1.40

Ohlsson & Rice No. 1
For Standard Ignition

A new formula containing special high performance lubricants and high quality fuel ingredients designed for use in any standard ignition engine. An ideal cool running fuel for sport flying. Easy starting, clean running, and cool operating. Supplies smooth power. Due to high grade ingredients used, it is recommended as break-in fuel for new engines.

Ohlsson & Rice No. 2
For Glow Plug

Methanol base in a new formula combining latest scientific fuel ingredients with special high performance lubricants. Easy starting, clean running, and cool operating, supplies steady smooth power. This fuel is recommended as a high speed racing fuel and can be used in engines having standard ignition if a fuel cut-off system is installed.

PINTS 75c
QUARTS $1.40

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